

# Railway Age

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SIXTY-FIFTH YEAR

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## WHY?

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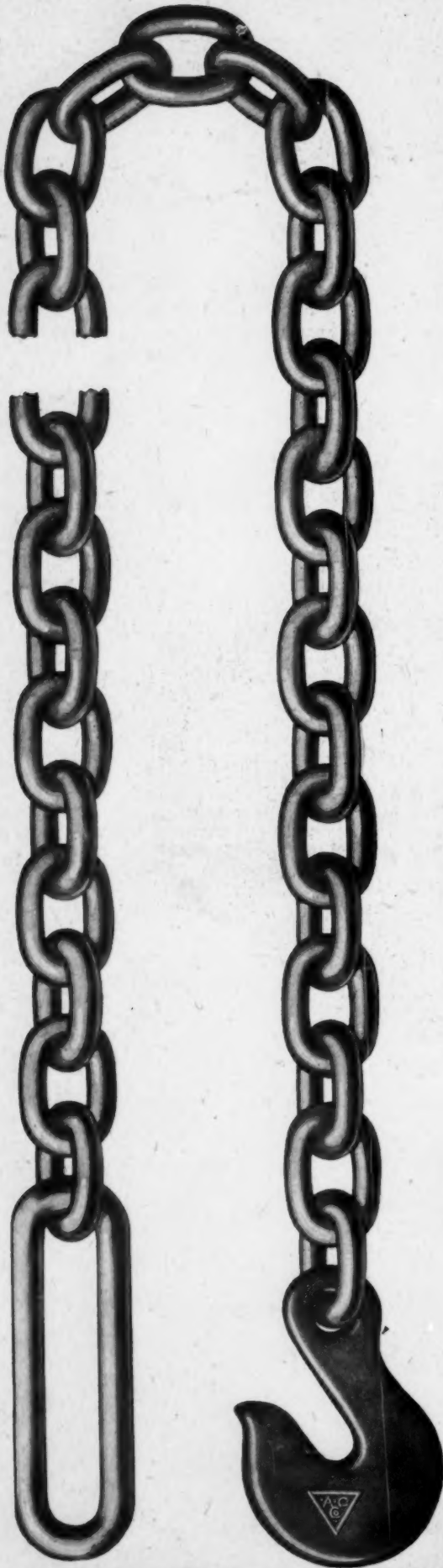
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## RAILWAY SWITCH CHAIN



# EDITORIAL

## Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

What does a locomotive cost and how much does it add to the burden of fixed charges annually assessed against income? It is not, as a matter of fact,

### Economics of Engine Terminals

the seven per cent on the seventy-five thousand dollars that may recently have been borrowed to cover the first cost of the locomotive, but a sum that varies in direct proportion to the average number of hours per day, days per month, or months per year, that the locomotive is actively in service. The cost per service-hour is the cost that counts and the problem of equipping and operating the railroads so as to get the maximum service-hours out of each locomotive is of outstanding importance. It is the terminal equipment that in nine cases out of ten determines how much of each day an engine must be held out of active service. Inadequate engine terminals not only retard the daily movement of locomotives, but prolong that portion of every year spent in the back shop resulting from neglected maintenance occasioned by inadequate terminal facilities. If the average time required to turn 24 engines at a terminal can be reduced one hour, this in itself is equivalent to adding one locomotive to the service, or in this day it would be equivalent to reducing the bonded debt of the railroad to the extent of about seventy-five thousand dollars. If improved terminal facilities will assist in reducing the average time required for handling engines through the terminal, is not the question deserving of greater consideration?

An English contemporary, in discussing reinforced concrete design, compares the rule of thumb methods with those followed by "experts," criticising the latter for unwarranted refinement, such as the spacing of bars to the "sixty-fourth of an inch." The argument is carried further by pointing to the limitations in actual construction which make such dimensioning ridiculous. Such discussion ceased to be popular in this country some 15 years ago. Speculation on the relative merits of "practical" and "theoretical" men have become passe, and it is now thoroughly established that, insofar as design is concerned, engineers must be possessed of *all* the necessary requirements, including not only a thorough understanding of the mathematics involved, but also a working knowledge of the actual construction methods. To attempt a design without a knowledge of the necessary mathematics is just as impractical as to proceed without knowing the physical conditions to be encountered, and just how the constructors must proceed in putting the design into effect. With the large number of men now being turned out year after year by the technical schools of this country, there is no excuse for the employment of a non-technical man on design work. Faulty designing practice on American railroads, when it is encountered, usually concerns the smaller roads where the diversified classes of work to be done occur at such infrequent intervals that men thoroughly experienced are not always to be found in the organization. The result is that a design is attempted without a thorough knowledge of what has been done by others. The solution in such cases is to build up a special organization as required, with men from the outside or to retain a consulting engineer specializing in this class of work.

### Once More the "Practical" and "Theoretical"

The use of white for clear as a night signal indication has been the primary cause of a number of serious railroad accidents. This color, when used for that signal aspect, is dangerous, yet some roads still use it to indicate a safe condition. It is unnecessary to review the various ways in which a false-clear signal may be caused through the use of such a color—the facts are too well known. However, it may be of interest to analyze the progress that has been made during the past few years in the replacement of the white light as a clear signal indication with a more favorable color such as green. The annual report of the Interstate Commerce Commission on block signals, compiled by the Bureau of Safety, shows that in 1913 almost forty per cent of all of the roads reporting used the white light for clear. During the next five years this percentage was gradually reduced until the railroads were taken over by the government, at which time approximately twenty-eight per cent still used white for clear, and by the end of the first year of government operation the percentage had dropped to 22. This decrease of six per cent in the one year, although in excess of the average annual replacement, was probably due to the carrying over of the program of unfinished work undertaken prior to government operation. The second year under the Railroad Administration, and the last year for which figures are available, the reduction in the use of white for clear was less than two-tenths of one per cent. In other words, the activities in this direction were practically at a standstill. It is evident that a definite program was under way prior to government operation with a view of reducing eventually the use of white for clear to a minimum, if not entirely eliminating it. Even though the costs of material and labor are now high, with little signs of reduction in the near future, the continuation of this program, now that the roads have been returned to private operation, should again receive the attention of the managements.

### White for Clear Is a Dangerous Color

The short lines have been allotted \$12,000,000 of the revolving fund and may possibly get a somewhat larger amount.

### Short Lines and the Revolving Fund

Applications for a share of this have already begun to come in and the director of capital expenditures of the Railroad Administration has asked the aid of the American Short Line Railroad Association in passing on the applications. The total applications received amount to considerably more than the amount to be allotted and the director general, in turning over to the Short Line Association committee the letters of application, laid down certain general principles for the guidance of the committee. These principles are of especial interest because presumably they throw light on the management of the revolving fund and its application to the larger roads as well as to the short lines. Refunding of maturing securities, except in some exceptional cases where bankruptcy would be followed by discontinuance of essential service, is not to be considered a legitimate use for the revolving fund. Improvements to roadway and structures are only to be considered where it is shown that the addition or betterment will

facilitate and expedite the movement of freight. Thus grade reduction, which would effect an economy but not expedite freight movement, would not be a legitimate object for borrowing from the revolving fund. Additional passing tracks possibly would be legitimate objects for the use of the fund. Where short lines desire to buy second-hand equipment from trunk lines the money received by the trunk lines must be re-invested in additional equipment. In other words, the use of the revolving fund must result in an actual addition to the total equipment in service in the country. The same thing applies to the purchase of freight locomotives. Additional passenger equipment will probably not be considered in making loans from the fund. It is significant that the American Short Line Railroad Association has been asked to act in an advisory capacity, and there is reason to believe that the advice of the committee will be accepted by the director of capital expenditures.

### It is Time To Make a Change

**A**N industry is in an unfortunate condition when men solicit employment in it only when they are unable to secure work elsewhere, for in times of depression labor works in it only as a temporary expedient, flocking to more favored industries in times of activity. This is the condition in which the maintenance of way department finds itself today. While the wage scale is of paramount importance, it is not the only consideration which handicaps the railways. One of the developments in the industrial life of the country during the last few years has been the increasing attention paid to the welfare of employees. The railways have participated in this movement only to a limited extent, and in the maintenance of way department, the largest employer of labor, almost not at all. It is not therefore surprising that this branch of railway service is one of the first to suffer and suffers most acutely during each recurring period of labor shortage. The continued interference with the season's program of work which this condition creates appears to have made little impression on the managements.

Only a couple of decades ago railway work was eagerly sought by the newly arriving immigrants from northern Europe and the country boys living along the roadside. Today this labor has almost entirely disappeared and only the dregs of the market are, in general, to be found on the tracks. To correct this condition it is necessary for railway men to change their attitude towards these employees and to realize that it is necessary that they be treated as skilled laborers. The nature of their work requires them to be located in small groups at intervals along the line or in camps which can be moved from place to place. This makes it necessary for the road to provide housing accommodations for many of these gangs; it is here that one of the principal difficulties arises, for the type of accommodations provided in the past has been one of the strongest factors tending to drive men into other work. The time has come when camps or houses must be provided which will be attractive to laborers. Equal attention must be given to the provision of adequate food of the proper character, while roads must provide other facilities, such as shower baths, if they are to compete with other industries.

No class of labor in railway service today is given as little attention or provided with as few comforts as maintenance of way employees. Maintenance officers must assume the largest part of the responsibility for this condition, for they have not impressed upon the managements the necessity for adequate care of their employees as successfully as have those officers in other departments. While final authority rests with the managements, the initiative is in the hands of the maintenance officers and they

must exercise it more forcefully than they have in the past if the disintegration of their forces is to be arrested.

### The High Cost of Railroading

**T**HE PUBLIC KNOWS that the prices of almost all the things it buys have advanced greatly within recent years. It apparently does not realize that the prices of most of the things that enter into the cost of living of the railways have increased much more in proportion than the prices of commodities in general, but this is a fact, and it is the principal reason why such large advances in rates are necessary. The public knows pretty well how much the railroad payroll has been increased. Here are a few illustrations of typical increases in the prices of things that railways have to buy:

A locomotive which in 1914 cost \$27,876 will now cost \$75,750, an increase of 171 per cent. In 1914 a railway had to pay only about 5 per cent interest on the money it invested in a locomotive, while now it must pay about 7½ per cent. Therefore, its interest charges on a locomotive bought six years ago were \$1,394 a year, while on a locomotive bought now they will be about \$5,681 a year, an increase in fixed charges of 310 per cent.

An average box car bought in 1914 cost about \$1,000, while now it would cost about \$3,000, an increase of 200 per cent. The interest on the investment in the car in 1914 would have been about \$50 a year, while now it would be about \$225 a year, an increase of 350 per cent.

The foregoing statistics illustrate the advances which have occurred in the prices of equipment and in the interest that must be paid on the investment in it. The increases in the cost of constructing track and bridges have not been so great but they have been very large. In 1915 a 90-foot through girder bridge could be bought and installed—not including masonry—for \$6,427. It would now cost \$15,117, an increase of 135 per cent. These figures are based upon records of the actual expenditures of a certain road. In 1915 this road paid \$12,550 per mile for merely the rail track fastenings, ties and ballast used in the construction of a new main track. The same materials would now cost \$26,234, an increase of 110 per cent. For like classes of materials used in building a mile of side track, including two main track turnouts, this road in 1915 paid \$8,620. The same materials would now cost \$16,904, an increase of 96 per cent.

One important cause of the increase in railway expenses is the advance in the prices of all commodities and therefore in the amounts that the railways have to pay for loss and damage to freight. A carload of apples in 1909 was worth \$900, while today it is worth \$2,300, an increase of 155 per cent. In 1909 the freight revenue on a carload of apples from Yakima, Wash., to St. Paul was \$255, while today it is \$319.50, an increase of only 25 per cent. If a railroad paid a claim for the complete loss of a carload of apples in 1909, it took the freight revenue from three and a half carloads of apples, while now it would take the freight revenue from seven carloads.

A certain railway recently was presented a claim for \$4,511 for the loss of a carload of beef. The high value of the beef was of course principally due to the increases in prices within recent years. The freight earnings from the shipment were \$113.40. Therefore, if the railway has to pay the entire claim it will take the revenue from forty similar carloads of freight—an entire trainload.

There is hardly a branch of railroad operation in which unit costs have not increased 100 to 300 per cent within the last five years.



## The Railways Must Work Together Better

THE PRINCIPAL WEAKNESS, from an operating standpoint, of the organization of the railways under government control, was that it centralized authority so much that the initiative of the managers of the individual lines was largely destroyed.

The principal weakness, from an operating standpoint, of private management of railways in this country always has been that there has not been enough co-operation regarding transportation matters between the various railroads. The managements of the individual companies have devoted themselves so exclusively to trying to improve the operation and promote the selfish interests of their own lines that many times the interests of the railways as a whole and of the general public have been more or less sacrificed.

In the long run, and especially when conditions are normal, decentralized private management, with the struggles it causes between the various roads to get traffic and to surpass each other in the efficiency and economy with which they handle it, is far better for the railways and the public, than centralized government management with its destruction of the rivalries and the initiative of the managements of the various lines.

But under private operation even when conditions are normal, and the facilities of the railways are equal to the demands of commerce, a large measure of co-operation between the various lines is essential to rendering service, and especially freight service, economically and satisfactorily. The fact that freight cars circulate throughout the country, regardless of their ownership, would alone create the necessity for a large measure of co-operation.

The necessity for co-operation in larger and larger measure becomes more and more imperative as the demands of traffic become greater in proportion to the facilities available for handling it. Under such conditions the tendency is for the number of cars on the railways that are large originators of tonnage to become smaller and smaller and for the number on the intermediate and terminal lines to become larger and larger, until acute congestions and car shortages develop, which reduce the total amount of business the railways as a whole otherwise could handle and do great injury to the railways as a whole and to the public.

The weakness of private management referred to, which has been manifested on so many occasions in the past, again has been felt since the railways were returned to private operation, and the entire question of what the railway managements are going to do to bring about better co-ordination of their operations, and thereby further their common interests as well as those of the public, while not sacrificing the interests of any individual road or its patrons, is up for consideration. It has been referred for study and report to a very able and territorially representative committee composed of the heads of the Baltimore & Ohio, the New York Central, the Pennsylvania, the Illinois Central, the Missouri Pacific, the Burlington, the New Haven, the Santa Fe, and the Northern Pacific systems. It is to be hoped that this committee will make a vigorous and constructive report, and that measures will be adopted which will solve the problem presented in a more satisfactory manner than it has been solved in the past.

In order to insure that each road will provide cars roughly in proportion to the amount of its own traffic, it is necessary to enforce the principle that ordinarily each road shall be allowed to use cars roughly equivalent in number to those it provides. The car service rules seek to do this by imposing per diem charges for the use by a railway of cars not its own; and by requiring, under penalty, that foreign cars when unloaded, shall be started toward home. These rules cause

cars to be distributed roughly in proportion to the demand of traffic and the ownership of the various roads when the total car supply is adequate to the demands of business. When, however, the total business offered is excessive in proportion to the total car supply it is necessary to have some less automatic and more arbitrary means of sending cars where they are most needed, and seeing that each railway and its shippers get their fair share of them. To serve this purpose the commission on car service was created.

The necessity for car service rules is obvious. Without them it would be impossible to carry on the general interchange of cars. It is equally obvious that the rules are valuable only in proportion to the extent to which they are observed; that every violation of them reduces their value; and that general disregard of them would make them worthless. And yet, under private operation, in every period of heavy traffic, when each individual road has been offered more business than it could handle satisfactorily, and at the same time use cars and deliver them to connections as the car service rules require, there have begun wholesale violations of the car service rules, the purpose of which has been to enable the roads committing the violations to get or keep more cars than they could get or keep if they obeyed the rules. These violations of the rules have sometimes been defended by the managements of individual lines on the ground that other roads have been violating the rules, or that they could not observe them and properly serve their own shippers, or that the rules are unjust. Such excuses have no validity whatever. If an individual road thinks the rules are not just, the thing for it to do is not to violate them, but to obey them and meantime try to get them made what it thinks they should be. If it cannot get them made what it thinks they should be, it should obey them anyway. It is utterly unreasonable for the management of an individual road to proceed on the assumption that it knows better what the rules ought to be than all the roads that join in making them.

The roads are pledged to obey orders of the Commission on Car Service just as they are pledged to obey the car service rules. Obviously, the orders of the Commission on Car Service must be implicitly obeyed if it is to do any good, or even if it is to be ascertained whether the commission can do any good. And yet, in every period of heavy traffic, when, if ever, the Commission on Car Service could do good, its orders, as well as the car service rules, have been frequently, and sometimes wantonly violated. These violations, like those of the car service rules, have been defended on the ground that the orders have been unjust or impracticable, or that the road obeying them would have to deprive its own shippers of cars that they needed. But if the managements of all the individual roads are to set themselves up as the final judges of whether they shall obey or even try to obey the orders of the Commission on Car Service, there is obviously no use in having a Commission on Car Service. And it is equally obvious that if some roads obey its orders and others do not, injustice and harm result to the roads and the shippers of the roads that do obey them, the beneficiaries of the injustice being the roads that violate or disregard them.

Prior to the adoption of government control long periods of normal traffic when the car service rules were fairly well observed and were practically all that were needed to secure reasonably satisfactory distribution of cars, alternated with periods of heavy traffic when the rules and the orders of the Car Service Commission invariably were violated in numerous cases. These periods of very heavy business, however, were usually short, and just about the time a good row had been started about the violations of rules and orders the business fell off, making the supply of cars sufficient to go around; the row was stopped and nothing much resulted from the abuses except a lot of criminations and recrimina-

tions. The problem the railways are now facing differs from those they ever faced in past years. It appears almost certain that for months and even years to come the demands of commerce will be continuously greater than the railways can meet. If, therefore, shortage of cars is to be accompanied in the future as it has been in the past by violations of car service rules and orders, these violations will become so numerous and chronic that a condition of utter anarchy will be created in the car service relations of the railways.

Such a condition would apparently justify the Interstate Commerce Commission in exercising continuously the authority given it by the Transportation Act to take direct control of car service matters. But to give the commission justification for doing this, except in the emergencies contemplated by the law, would be to admit that the railway managements are incapable of handling matters, which, it is their plain duty to themselves, to their stockholders and to the public for them to handle. It would be a long step toward a return to government operation, and the railway managements would have afforded seeming justification for it.

Perhaps no one can reasonably quarrel with the railway manager who says that he intends to put the stockholders and customers of his own railway first. But it is very easy to differ from the railway manager who thinks he is furthering the real interests of his own stockholders or patrons when he fails to co-operate fully and in good faith with the managers of all the other lines under present conditions to enable the railways as a whole to render the largest and best public service of which they are capable. There is enough traffic available at present to make every road in the country, with the full complement of equipment to which it is entitled on its own lines, work to its capacity. Any road which under present conditions tries to keep on its own lines more equipment than it is entitled to is simply playing a crooked game with its fellow roads, while any road which tries to handle more than its reasonable share of the business is simply trying to do what, under present conditions, it is incapable of doing and thereby jeopardizing its own maximum efficiency as well as that of the railways as a whole.

If the railways are themselves to solve the problem of getting freight cars handled with the greatest practicable justice and efficiency it would appear that sterner measures for policing themselves must be adopted by them than ever have been adopted in the past. If car service rules and orders of a Commission on Car Service are to be relied on to secure proper handling of cars the penalties for violating the rules and orders must be made heavy enough really to deter violations of them. Provision must also be made for promptly detecting every violation and strictly enforcing the full penalties against the responsible parties. To carry on the supervisory and investigating work properly will require a strong organization, having the active backing of the railway executives themselves; and some railway managers strongly object to the upbuilding by the railways of organizations to control or even supervise what the management of any individual road shall do about almost anything—even including what it shall do with cars that do not belong to it, but to other railroads! Isn't it about time, however, that all railway managers learned that failure on the part of the railways to do individually or collectively the thing that they ought to do individually or collectively simply results in the exercise of increased governmental power? And, in view of past experience can any railway manager really believe that all the railways will in future, without government intervention, faithfully carry out the car service rules and orders of the Commission on Car Service unless all the railways join together in creating some more effective means for getting these rules and orders obeyed than they have in the past?

## Southern Pacific

SOUTHERN PACIFIC stock is selling at around 93 on the New York stock exchange. The company cannot, therefore, under present conditions, finance new capital requirements through the sale of stock at par, which is a suggested criterion for sound railroad credit. Nevertheless the Southern Pacific is one of the very few American railroad companies which even under present circumstances has good credit when compared with the strongest industrial companies. As a proof of this, in 1919, holders of \$26,670,000 four per cent convertible Southern Pacific bonds exchanged their bonds for stock at 130. The reasons that led to this exchange are numerous and varied, but whatever the particular circumstances were which led individual holders to desire to change a 4 per cent bond for a 6 per cent stock, it seems safe to say that it is an indication that the Southern Pacific stock is still an attractive investment. The history of the Southern Pacific convertible bonds throws some rather interesting sidelights on the recent history of American railroad credit.

In 1909 the Southern Pacific offered to stockholders to the extent of 30 per cent of their holdings \$82,000,000 of 4 per cent twenty-year convertible bonds at 96. The bonds were convertible into stock at 130 up to June 1, 1919. All but about \$200,000 of the \$82,000,000 bonds were subscribed for. They sold in the open market in 1910 at above par. They went below 80 in 1914 and again in 1915, and in 1918 sold as low as 75½. In the six months of 1919 to June 30, that is the last six months during which the conversion privilege of the bonds attached to them, they sold as high as 87½. Prior to January 1, 1919, only about \$1,000,000 of the convertible bonds had been exchanged for stock. The fact that over \$26,000,000 of the bonds were converted shows how highly Southern Pacific stock is still regarded by investors; but, on the other hand, the fact that over \$50,000,000 of these bonds were not converted and will have to be refunded in 1929, shows how far below the hopes of the Southern Pacific's bankers the market for the best railroad securities now is.

The Southern Pacific made a good showing in 1919, although the comparison with 1918 is not on its face favorable. Under government operation the road earned \$239,657,000 gross—an increase of \$18,046,000 over 1918, or 8.14 per cent. Almost the entire increase in revenue, however, is due to increased rates. The ton mileage of revenue freight was 6.52 per cent less in 1919 than in 1918 and the passenger miles were but 7.28 per cent greater. Ton mileage in 1919 amounted to 11,933,000,000 and the passenger mileage to 2,379,000,000. The revenue per ton per mile of freight was 1.286 cents in 1919 as against 1.113 cents in 1918, and the revenue per passenger per mile was 2.471 cents in 1919 and 2.390 cents in 1918.

Operating expenses, as with other roads, rose out of all proportion to the business handled. Total operating expenses in 1919 were \$186,927,000—an increase of \$24,205,000 over 1918, or 14.88 per cent. In 1917, the year before the government took over the operation of the property, revenues amounted to \$193,971,000 with the then existing rates, and net after the payment of expenses amounted to \$73,370,000. This net compares with \$58,889,000 in 1918 and \$52,730,000 in 1919.

The government sustained a loss of \$4,334,000 after paying the rental in 1919, as contrasted with the profit in 1918 of \$7,758,000. The total increases in wages and material prices in the two years of federal operation was \$53,171,000, which accounts for an increase of about 40 per cent in operating expenses. It is rather interesting to note that of the increase of \$18,046,000 in expenses in 1919, as com-

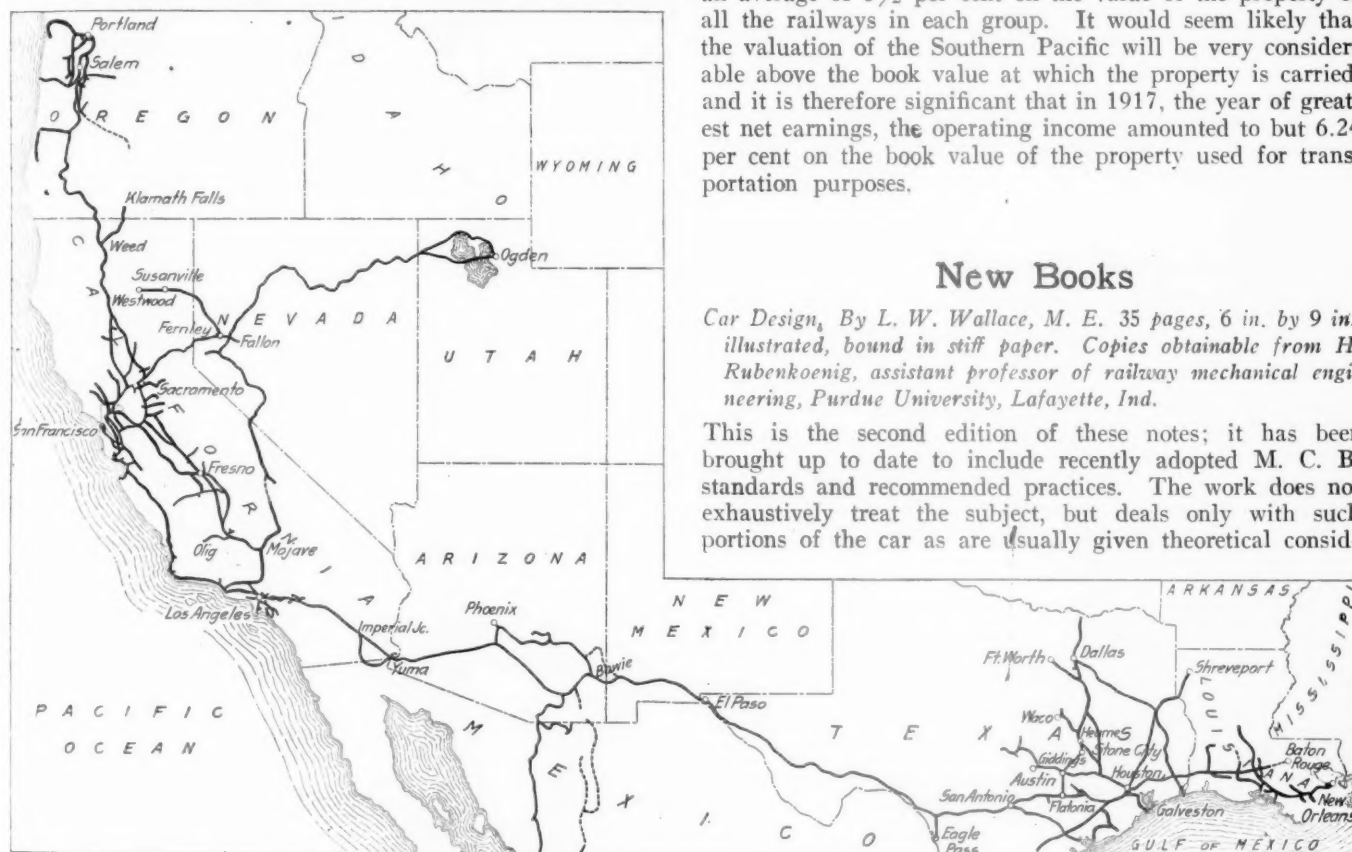


pared with 1918, \$5,372,000 is accounted for by increases other than those in wages or prices.

Measuring the performance of the Southern Pacific in units other than dollars and cents, the operations compared favorably even with 1917. The average train load of all freight was 641 tons in 1919, a fraction of a ton less in 1918, and 603 tons in 1917. This was notwithstanding the fact that in 1919 the percentage of loaded to total freight car miles was only 69.74, whereas in 1918 it was 71.02 and in 1917, 72.14. Car loading has already begun to drop off. The average loading per loaded car in 1919 was 25.42 tons. It was gotten up in 1918 to an average of 26.98 tons. In 1917 it was 25.34 tons. A saving was made in fuel consumption. In 1919 in passenger service a gross weight of 5.08 tons was moved per pound of coal; in 1918, 5.05 tons and in 1917, 5.10 tons. In freight service 6.67 tons were

won a final decree. Julius Kruttschnitt, chairman of the executive committee, in his annual report says that the oil lands involved in the suit which the government won are non-productive lands not regarded as valuable by the company. In the other class of cases, the company now has a final and conclusive decision in its favor. These suits involved 161 acres of "productive and valuable" oil lands. The United States District Court decided on August 28, 1919, in favor of the Southern Pacific, and the attorney general, on December 5, 1919, announced that he would take no appeal to the Supreme court and, since it is now more than six months since the cases were decided apparently no appeal can be taken, so that the long disputed title to the oil lands is now safely with the Southern Pacific.

Just a word more might be said about the financial standing of the company. The Transportation Act provides for an average of  $5\frac{1}{2}$  per cent on the value of the property of all the railways in each group. It would seem likely that the valuation of the Southern Pacific will be very considerable above the book value at which the property is carried, and it is therefore significant that in 1917, the year of greatest net earnings, the operating income amounted to but 6.24 per cent on the book value of the property used for transportation purposes.



The Southern Pacific

moved per pound of coal in 1919, 6.06 in 1918, and 6.11 in 1917. The use of superheaters is in part responsible for this saving.

Maintenance expenses in 1919 increased very considerably. Especially is this so of maintenance of way, the total cost of which was \$34,800,000 in 1919, or 34.75 per cent more than in 1918. Maintenance of equipment cost \$47,969,000—an increase over the previous year of 17.72 per cent.

The company was forced to accept 1,000 box cars at a cost which is to be between \$2,815,000 and \$3,072,000. The company has now placed orders for 42 locomotives, 50 passenger cars, 750 freight cars and 130 electric cars. It is building in its own shops 30 locomotives and 4,065 freight cars. The cost of this equipment is to be provided for through the issue of equipment trust certificates.

An important factor in the price at which Southern Pacific stock now sells is the ownership of oil lands by the Southern Pacific. These lands were the subject of suits by the government. In one class of cases the government has

## New Books

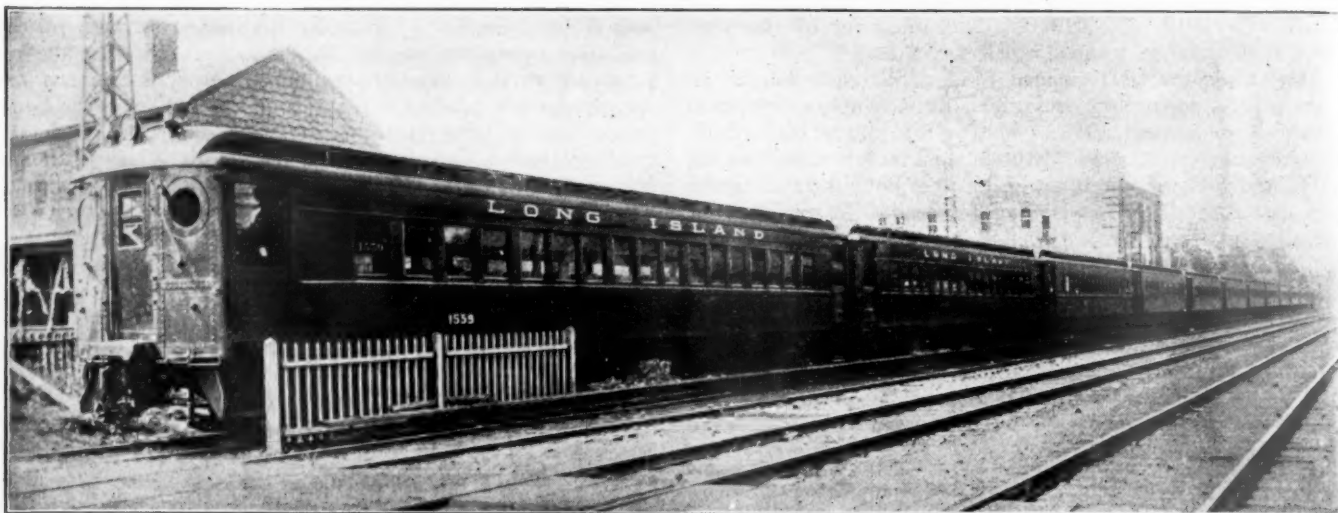
*Car Design*, By L. W. Wallace, M. E. 35 pages, 6 in. by 9 in., illustrated, bound in stiff paper. Copies obtainable from H. Rubenkoenig, assistant professor of railway mechanical engineering, Purdue University, Lafayette, Ind.

This is the second edition of these notes; it has been brought up to date to include recently adopted M. C. B. standards and recommended practices. The work does not exhaustively treat the subject, but deals only with such portions of the car as are usually given theoretical consid-

eration by the car designer. It is only intended to meet the needs of classroom work, and is especially valuable to those technical schools giving railway mechanical engineering courses which include car design. The practical car designer may also derive some benefit from the work.

THERE WAS A MAN in our shop, he was so wondrous wise; he wouldn't wear his goggles—now he has no eyes.—*Fred Meyers.*

POWDERED COAL is to be used throughout for firing boilers and furnaces in the New sheet mill of the Falcon Steel Company now being erected at Niles, Ohio. The power plant boilers will be powdered-coal fired, using the Quigley compressed-air system for transporting and burning the coal. The pulverized coal will be transported from the milling plant through standard 4-in. diameter wrought pipes to furnaces and boilers for various distances aggregating approximately 800 ft. and will be switched from the main distribution line to a storage bin in the power house for use as required.—*Power.*



\* Multiple Unit Train on the Long Island

## New Electric Motor Cars for the Long Island

Very Few Changes Have Been Made for Purpose of Perfecting  
Equipment Built 15 Years Ago

By S. B. Schenck

Westinghouse Electric and Manufacturing Company

**T**HE LONG ISLAND RAILROAD recently ordered from the American Car and Foundry Company, twenty electric motor cars and fifty trailer cars for use in suburban service on its electrified zone which extends over much of the western part of Long Island.

The electrification has been in operation since 1905 and at present comprises over 88 miles of route with 208 miles of electrified track. This installation represents the first large scale electrification of a steam railroad and it is the most extensive example of multiple unit passenger service in operation.

The fast, frequent, and reliable train service given by electric operation has played an important part in the remarkable growth of Long Island's population and consequent freight traffic. Since beginning electric operation the passenger traffic has increased approximately 385 per cent, freight traffic about 193 per cent, and earnings 197 per cent. Statistics for the year 1918 show that the Long Island stands first among all railroads for density of passenger traffic. At present, there are over 532 scheduled electric trains operating daily over this road giving an annual service of over 600,000,000 passenger miles.

This passenger traffic is transported mainly by multiple unit trains operating out of the Pennsylvania Station, New York City, through the East River Tunnel and from the Flatbush Avenue Terminal, Brooklyn, to the adjacent suburban territory and seashore resorts. A small part of the traffic is carried by express trains hauled to and from the Pennsylvania Station by electric locomotives. The traffic to the seashore has increased greatly during the past four or five years and the new equipment ordered recently will provide added facilities for handling this traffic.

The multiple unit trains render possible the operation of schedules with close headway because of the ability of such trains to reach a maximum speed in a very short time. The use of motor and trailer cars provides a very flexible system for caring for the varying volume of passenger traffic.

The electric operation over elevated structures, in subways, on the surface, and also the desirability of a system of electric distribution which was standard on connecting lines led to the adoption of the third rail contact line and direct-current of 600 volts. The direct current is obtained from rotary converter substations which, in turn, receive alternating current from the Long Island City Power House through an 11,000 volt, 3-phase transmission line.

When the 20 motor cars and 50 trailers are placed in service, the Long Island Railroad will then have in operation a total of 488 motor cars and 140 trailers. One hundred and thirty-four of the motor cars are equipped with 200 horsepower motors and the other three hundred and fifty-four motor cars, including the new cars, are all equipped with 225 horsepower motors. The increase in motor capacity is due largely to increased weight of the cars. All motor cars are equipped with Westinghouse automatic type unit switch control.

Trailer cars have been used since the inauguration of electric operation on this road. Some of the trailers are used only during the summer months when the passenger traffic to the seashore is greatly increased in volume. All trailer cars are equipped with control train line, but they are not provided with apparatus for train control from the vestibule, this feature being obtainable from either end of the motor cars that are placed at the ends of the train.

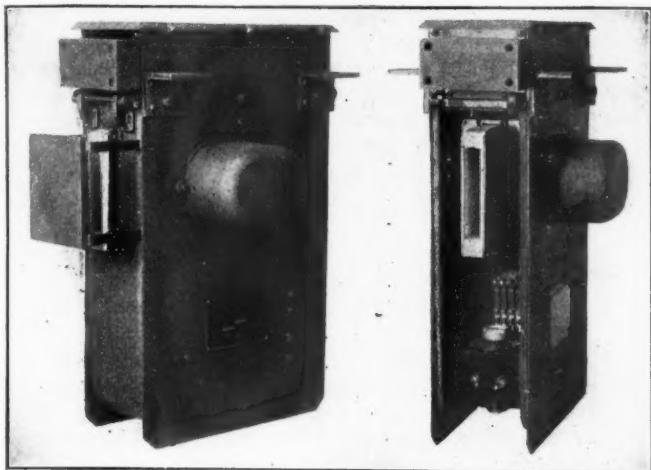
Each new motor car will be equipped with two motors. The type No. 308, commutating pole motor embodies the box frame construction. The frame is a one-piece steel casting with large openings bored out at each end for receiving the armature bearing housings and permitting ready removal of the armature for overhauling. Both armature and axle bearings are arranged for oil and waste lubrication. Nose suspension is employed.

Type "BP" gears and pinions, with helical teeth, transmit the torque from the motor armature shaft to the axles. The pinion has 25 teeth, 2 diametral pitch, and is cut from



a solid steel forging. It is pressed and keyed on the armature shaft. The gear has 48 teeth, and is machined from a solid steel forging, and pressed on the axle. The gear case is of malleable iron, divided in halves horizontally and supported at the front and rear ends by lugs projecting from the motor frame and motor axle cap.

The automatic type unit switch control equipments ordered for the new motor cars are duplicates of the control equipments furnished for the motor cars in 1905, except for a few minor changes. The original control equipments are still in operation. Electro-pneumatic unit switches are used throughout. These switches are operated by com-

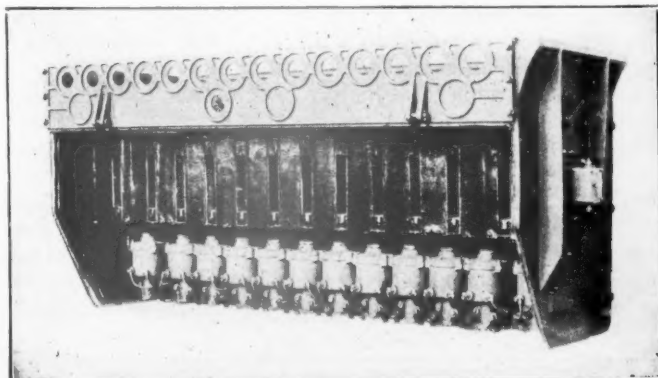


Line Switch with Overload Relay for Protection of Contactors and Motors

pressed air, governed from control circuits that are energized from a low voltage storage battery. Such an arrangement provides action of the switches regardless of the third rail voltage. The heavy pressure obtainable by the use of a pneumatic switch insures good electrical contact of the

operates at a predetermined current value to close the switches in correct sequence and accelerate the car at a constant rate. The use of a limit relay to obtain constant accelerating rates prevents abuse of the motors in starting.

The master controller, limit relay, and control train line

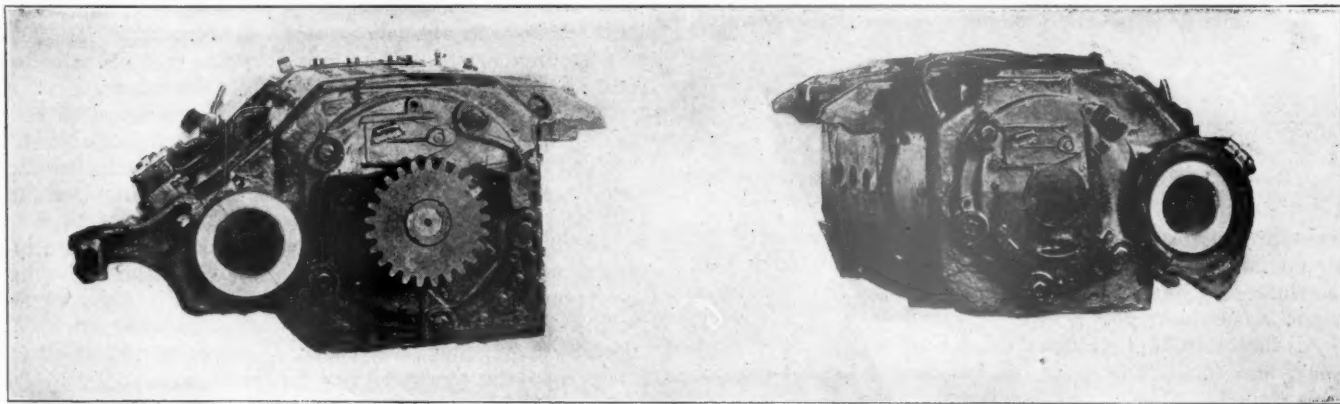


Unit Switch Group

details are of standard Westinghouse construction for such service and present no unusual features. The main power circuit control apparatus has some interesting features and a somewhat detailed description of this apparatus follows:

One of the features of the control on both the old and the new cars is the use of a circuit breaker or "line switch" mounted separate from the main group of unit switches. This line switch is operated electro-pneumatically in the same manner as the unit switches. It acts as a circuit breaker to disconnect the motors from the line in case of overloads or grounds on the motors. Any heavy abnormal arcs are thus removed entirely from the switch group and confined to one piece of apparatus built for heavy arcing duty.

The twelve individual electro-pneumatic switches are assembled with blowout coils in one group. These switches, like the line switch, are closed by compressed air working



Type of Motor Used on Motor Cars

switch jaws. The low voltage battery control circuits are free from insulation breakdown. The battery provides a means for obtaining emergency braking at any time and also is a source of energy for signal or emergency lights when power is not available from the third rail.

The automatic type control embodies the use of a small master controller which directs, through the "train line," the operation of the electro-pneumatic unit switches and reverser which effect the necessary connections between the third rail, resistor and motors. The operation of the unit switches is made automatic by means of a limit relay which

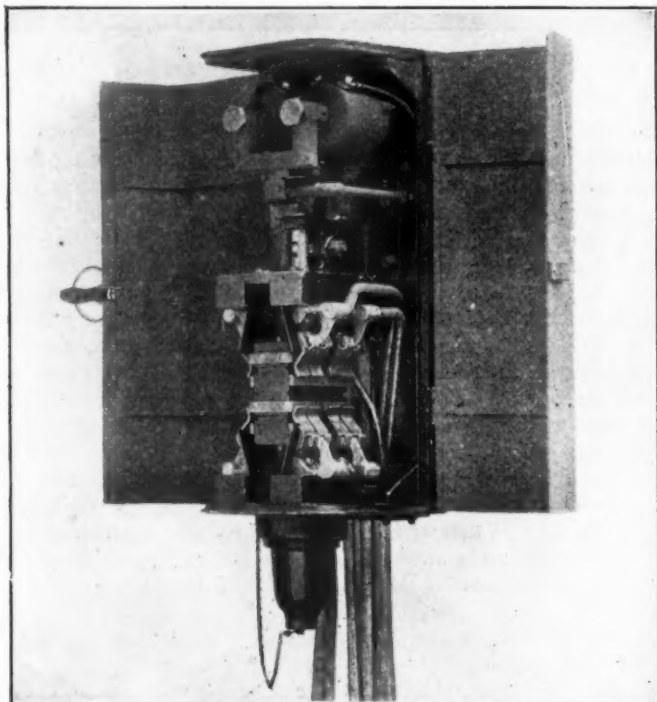
against a heavy spring that normally holds the switch open. The heavy spring insures a positive opening of the switch. The compressed air is admitted to the switch cylinder by means of a small air valve which is operated by an electro magnet. This magnet is energized from the control train line circuit which extends through the entire train from the master controller at the head end of the train.

The direction of motion of each car is governed by the reverser. One reverser is mounted on each car. The reverser changes the direction of rotation of the motors by interchanging the connections to the motor fields. This interchange is

made by contacts carried on a two position movable plunger that is moved to one or the other position by compressed air admitted to pistons through the air valves. These valves are similar in operation to those in the switch group.

At both ends of the car the bus and the train lines are run to their respective receptacles and also to respective jumper heads. The receptacle is fastened directly to the car. The jumper head is attached to a length of flexible cable that is permanently connected to the circuit on the cars. When cars are coupled together the jumper head on one car is inserted in the receptacle on the other car, thus extending the circuits from car to car. When not in use in this manner, the jumper head is held in a "dummy" receptacle fastened to the end of the car.

The control train line is energized from a 14-volt storage battery. Two batteries per car are employed, one battery being used to operate the control, while the other battery is being charged. When charging, the battery is shunted by



Reverser Which Changes Motor Field Connections

resistance that is connected in series with the motor of the air compressor. A relay disconnects the battery from both the shunt and compressor motor circuits when the compressor motor is not running.

All the control apparatus except the master controller, limit relay, and small control cut out switches is located beneath the car body. The wiring connections between the various pieces of apparatus are carried on iron conduits, making a very substantial and reliable construction. The apparatus is so located on the car that quick and thorough inspection is facilitated.

The control equipment is practically a duplicate of that installed 15 years ago. The motors are duplicates of those in service for the past 10 years.

THE FREIGHT CAR SETS THE PACE.—Because the freight car sets the pace, the progress of the country is in danger of being slowed down to a crawl. Government and other agencies will have to establish a definite transportation program and persistently, systematically and effectively strive to put it into operation. —Chicago News.

## Transportation in Bolshevik Russia in 1920

By Gregory Alexinsky

**D**URING MY RECENT TRIP to Finland and Esthonia I had the opportunity to gather material which elucidates the economic situation of Bolshevik Russia. This material represents a special value, in the first place, because it belongs to the end of January of the current year, consequently contains the very latest available data, and, in the second place, because it emanates from official Bolshevik sources and thus represents an economic portrayal of the Bolshevik regime drawn by the leaders of this regime themselves.

Among the documents in my possession I have the stenographic reports of A. Rykov, the chairman of the Supreme Council of National Economy, of M. Tomski, the chairman of the Central Council of Trade Unions, of Trotsky and Lenine, and of Kameney, the chairman of the Moscow Soviet. Let us see how they are characterizing the economic situation of Bolshevik Russia in January, 1920.

On January 25, 1920, Rykov read a report to the joint congress of delegates from councils of national economy, trade unions, and the Moscow Soviet. He said, among other things:

"The civil war having caused an unparalleled waste of the human and material resources of the Republic, has engendered an economic and productive crisis. In its main features this crisis is one of transportation, fuel and human labor power.

"Before the war the percentage of disabled locomotives, even in the worst of times, never rose above 15 per cent. At the present time, however, we have 59.5 per cent of disabled locomotives. The repair of disabled locomotives also keeps on declining with extraordinary rapidity: before the war we used to repair up to 8 per cent; this percentage after the October revolution sometimes dropped to 1 per cent; now we have gone up, but only 1 per cent, and we are now repairing 2 per cent of our locomotives. Under present conditions of railway transportation the repairs do not keep abreast of the deterioration of our locomotives, and every month we have in absolute figures 200 locomotives less than the preceding month. It is indispensable that we raise the repair of locomotives from 2 per cent up to 10 per cent, in order to stop the decline and further disintegration of railway transportation, in order to maintain it at least on the level on which it stands at the present time. As for the broad masses of the population, the workers and peasants of Soviet Russia, these figures simply mean that there is no possibility of utilizing any one of those grain-producing regions, nor those which have raw material and fuel, that have been added to Soviet Russia as a result of the victory of the Red Army."

Rykov then cites the concrete examples which most clearly illustrate the results of the Bolshevik policy in the field of railway transportation.

"We have a metallurgical region in the Ural mountains; but we have at our disposal until now but one single special train a month to carry metals from the Urals to Central Russia. In order to transport 10 million poods (1 pood equals 36 lb.) of metal by one single train per month several decades would be required, should we be able to utilize those scanty supplies of metal which are ready in the Urals.

"In order to deliver cotton from Turkestan to the textile factories in Moscow, we have to carry more than one-half million poods per month—up to 600,000 poods. But at this time we have only about two trains a month, i.e., scores of years will be required for transporting under present conditions from Turkestan those 8,000,000 poods of cotton



which we could convert, but are unable to deliver to the factories."

But it would be a mistake to imagine that the shortage of raw materials is caused only by the transportation crisis. In the same report of Rykov we read on:

"On account of the disorganized state of transportation we are unable to obtain cotton now, as the railroads are unable to carry it here. But even as regards those raw materials which are produced in the central parts of Soviet Russia, such as flax, wool, hemp, hides, even in these raw stuffs Soviet Russia is experiencing a severe crisis."

As regards coal, Rykov claims (according to inaccurate data, it is true) that in the Donetz Basin there are more than 100,000,000 poods of coal on the surface, ready to be shipped. "But until the reconstruction of bridges and re-establishment of railroad communications in the Donetz territory these coal supplies cannot be utilized." But also that other mineral coal region—near Moscow—which has all the time been at the disposal of the Bolsheviks, being outside of the civil war territory, "has until now not only not yielded what it should yield to the fuel supply of Soviet Russia, but production during the past year remained on the same low level as the previous year, falling short even of 30,000,000 poods of coal." Rykov complains that even "under the Czar, during the Imperialistic war, the Czarist officials, with the aid of war-prisoners, succeeded in raising the production of coal in the Moscow coal-fields to a goodly 40,000,000 poods," while under the Soviet government it has not increased but decreased.

Rykov, of course, does not draw from this fact the logical, but to the Bolshevik authorities disadvantageous, conclusion that their officials are even worse than those of the old regime and that the workers of a "communist" country have been brought by this administration to such a condition as to be unable to stand in productivity of labor on the level even with war-prisoners!

"If the workers and peasants," says he, "have until now received no bread, and if up to this time a food shortage exists in the greater part of the starving consuming localities, the cause does not lie in inadequate preparations but in the fact that we are unable to ship and distribute the grain already carted and stored in the granaries."

The Bolshevik government, of course, cannot satisfy this sensible demand, as an official return to free trade would be tantamount to an official confession of the total bankruptcy of the economic policy of Bolshevism. Hence Rykov prefers to let the matter rest at a few phrases about the need of "making the strongest effort" towards the improvement of transportation, etc. As a practical way out, according to information by Rykov, "The Council of People's Commissaries has already decided to call upon individual workmen as well as groups of them to repair the rolling stock, granting them the right to use the equipment which they shall have repaired with their own forces for the transportation of food to those factories and mills which repair the locomotives and cars. Recently this decision has been also extended to the fuel supply. Each factory and each mill now has the opportunity to carry its own fuel, provided they repair with their own forces the disabled locomotives and cars they obtain from the commissariat of ways and communications."

It is hardly possible to conceive a less successful expedient than the one conceived in this particular instance by the People's Commissaries. To leave it to each factory, instead of to a single, well-planned organization, to repair for itself locomotives and cars so as to carry for its own needs food and fuel, that only means smashing up those few shreds of transportation that still remain. To turn over to separate groups of citizens the transportation system, i.e., that which serves as the fundamental means of communication between the several parts of the country, to tear to shreds this

connection, is not even Bolshevism, but simply an absurdity apparently dictated by a state of despair on the part of men who realize the hopelessness of their position.

I must point out, by the way, that Rykov still looks too optimistically upon the conditions of transportation. This, at least, is the impression one gains by comparing the figures cited by Rykov with the statements made at that same congress by Trotzky, according to which the number of disabled locomotives exceeds the number quoted by Rykov, for Trotzky says:

"We frequently call, sound, half-disabled locomotives which threaten to drop out completely on the morrow."

## Priority for Coal Shipments

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 19 issued two additional priority orders in favor of bituminous coal shipments, one giving preference to pooled coal for trans-shipment at tidewater for movement to New England and other coastwise points, which amounts practically to a temporary embargo on export coal, and the other giving bituminous coal the preference in the use of open top cars east of the Mississippi river for 30 days and providing for an embargo against consignees that do not unload coal cars within 24 hours.

The commission had previously issued a priority order for pooled lake cargo coal. The additional orders were issued in response to urgent appeals from New England for an embargo against exports of coal accompanied by representations of a serious condition threatened by a shortage of coal shipments and in response to repeated demands from coal operators for an improved car supply, backed up by industries and public utilities that have already experienced or have been seriously threatened with a shortage of fuel.

Both orders state that, in the opinion of the commission, "because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions which continue to exist," and "because of the inability of common carriers properly and completely to serve the public in the transportation of coal," an emergency exists which requires immediate action.

Service Order No. 6 orders:

"That the common carriers by railroad hereinbefore described be, and they are hereby, authorized and directed, effective June 24, 1920, and until the further order of the commission, in the transportation of bituminous coal consigned to any tidewater coal transshipment pier at or north of Charleston, S. C., and in the supply of cars therefor, and in the movement of such traffic, (a) to give preference and priority to carloads of such coal consigned to James J. Storrow, whose address is Boston, Mass., as a part of a pool or pools of bituminous coal at any such port for transshipment by water to any New England coastwise destination, or consigned as a part of a pool or pools of bituminous coal at any such port for transshipment by water to any United States coastwise destination other than New England; (b) and to furnish transportation of bituminous coal and cars therefor, consigned to any of said ports either for bunkering or for cargo purposes, only upon a permit and direction therefor issued by J. W. Howe, Commissioner, Tidewater Coal Exchange, Inc., New York, for piers within New York Harbor, Philadelphia, Pa., and Baltimore, Md.; by E. I. Ford, Commissioner, Newport News Coal Exchange, Newport News, Va., for piers at Newport News, Va.; by E. M. Graham, Manager, Lamberts Point Coal Exchange, Norfolk, Va., for piers at Lamberts Point, Norfolk, Va.; by S. T. Snead, Commissioner, Sewalls Point Coal Exchange, Norfolk, Va., for piers at Sewalls Point, Norfolk, Va.; and by Frank McCabe, General Agent, Southern Railway Company,

Charleston, S. C., for piers at Charleston, S. C., each of whom is hereby designated as an agent of the commission therefor, which permit and direction shall be issued only upon a showing that the destination of the water movement of such coal is a United States coastwise point, or if otherwise, that the preference and priority hereby directed will not be impeded thereby, and in any event, that the shipper or consignee will be able to unload such coal at the port of transshipment without delay to the rail equipment.

*"It is further ordered,* That each of said common carriers by railroad shall establish such rules and regulations respecting the placement of cars for unloading and of vessels for loading at such piers as will effect the preference and priority in transportation hereby directed, including the dumping of cars."

Service Order No. 7 directs the roads east of the Mississippi River which serve coal mines, whether located upon the line of said railroad or customarily dependent upon it for car supply for the period of 30 consecutive days beginning with June 21, 1920, to furnish such coal mines with open top cars suitable for the loading and transportation of coal in preference to any other use, supply, movement, distribution, exchange, interchange, or return of such coal cars; provided, that such coal cars may be used in service moving in the direction of the mine or mines to be supplied, on the return movement, after the discharge of the coal lading thereof, upon a route not materially out of line and to points not beyond such mine or mines.

Non-coal-loading carriers are ordered during said period to deliver daily to a connecting coal-loading carrier or carriers, empty or loaded coal cars up to the maximum ability of each such non-coal-loading carrier to make such deliveries, and of each such connecting coal-loading carrier to receive and use the coal cars so delivered for the preferential purposes set forth.

Carriers are directed forthwith, and during said period, to discontinue the use of coal cars for the transportation of commodities otherwise than as hereinbefore specified (a) as to each coal-loading carrier, so long as any coal mine remains to be served by it with coal cars, and (b) as to each non-coal-loading carrier, so long as deliveries of any coal cars to connecting carriers may be due or remain to be performed under the terms of order.

Carriers are also authorized and directed, effective June 23, and until the further order of the commission, to place an embargo against the receipt of coal by any consignee, and against the placement of coal cars for consignment to any consignee, who shall fail or refuse to unload coal placed for unloading within 24 hours after such placement, until all coal so placed has been unloaded by such consignee, provided, that this authorization and direction shall not interfere with the movement of coal under permit to any coal pool or pools when authorized by any order heretofore or hereafter entered by the commission.

It is further ordered, that all rules, regulations and practices of said carriers with respect to car service are hereby suspended in so far only as conflicting with the directions made; and that the authorizations and directions are to be considered as not conflicting with or superseding any service order heretofore entered by the commission.

The final appeal on behalf of New England was made on June 16 by the lieutenant-governors of Massachusetts and New Hampshire and a delegation who held a conference with Chairman Clark and Commissioner Aitchison, who is in charge of car service matters for the commission. Several other conferences followed in which President Aishton of the American Railroad Association and members of the Commission on Car Service took part before the orders were issued.

An order giving coal a preference over road-building and construction materials and other commodities in the use of open top cars has been expected for some time by the interests who desired or feared such a step, but it is understood that the commission was most reluctant to order any priorities unless the situation became so acute as to make it absolutely necessary. The coal operators, who have been receiving scarcely half of a full car supply for some time, have made repeated demands for a greater supply of cars, while the sand and gravel interests have protested vigorously against any such action, representing the public need for their commodities for road-building and for housing and objecting particularly to any preference for coal unless there is a discrimination between the essential and non-essential uses of coal. The coal interests also have vigorously objected to any embargo on exports, pointing out that domestic coal is used for the manufacture of other articles of which no one has endeavored to prevent the exportation.

The Commission on Car Service on June 2 had issued an order directing the roads to use open-top cars for coal up to 50 per cent of the coal loading requirements before using them for any other commodity.

### Opposes Embargo on Coal Exports

J. D. A. Morrow, vice-president of the National Coal Association, on June 16 issued a statement arguing against an embargo on exports, in which he said in part:

"The only reason that more coal is not produced is the fact that the operators do not have the railroad cars to ship the coal from the mines to the consumers. The Geological Survey reports show that during the month of May the mines were prevented from shipping 45 per cent of the coal they might have shipped through lack of cars. Thus, even if no coal were being shipped abroad we would still be running from 5,000,000 to 7,000,000 tons per month below the requirements of the United States alone. And nothing will help that situation except more railroad cars at the mines to move the coal to consumers.

"The Interstate Commerce Commission has full authority to give that relief. The railroads several weeks ago requested the commission to direct the placing of additional cars at the coal mines. The National Coal Association a month ago also requested the Interstate Commerce Commission to take prompt, decisive action, so as to enable the operators to produce and distribute adequate supplies of coal.

"In the meantime an unlawful and unfair distribution of railroad cars among the mines, put into effect by the carriers with the apparent sanction of the commission, has made matters worse.

"As yet the Interstate Commerce Commission has done nothing which deals effectively with the car shortage at the coal mines. Officials of the National Coal Association are taking the matter up again with the commission, urging immediate action to provide the coal cars needed. If such action is forthcoming it will end any danger of coal shortage."

The Advisory Council of the National Sand and Gravel Association also gave out a press statement objecting to the "rationing" of cars in favor of the coal industry on the ground that the operators by various methods had brought about a false famine and were using the present opportunity to boost profits and profiteer in a shameless manner. It was asserted that on practically every line in the country thousands of open top cars suitable for carrying coal were lying idle or filled were choking traffic because of the vast number of cars used in moving this one commodity.

The Shipping Board has arranged to assist in the movement of coal to New England by allocating for that purpose a number of ships that have been utilized for export coal.



# The American Society for Testing Materials

## Several Reports Were Presented Which Are of Considerable Importance to the Railroads

THE TWENTY-THIRD ANNUAL MEETING of the American Society for Testing Materials was held this year at Asbury Park, N. J., instead of Atlantic City. The attendance was large and an extensive program was given covering 60 separate reports, papers and addresses.

The following officers were elected for the ensuing year: President, Geo. S. Webster; vice-president, Geo. K. Burgess; four members of the executive committee, L. G. Blackmer, D. E. Douty, Prevost Hubbard and R. S. Whiting.

J. A. Capp, the retiring president, made an address on the growth of the work done by the society and the responsibilities of the members in furthering the expansion of the society and its aims.

A summary of the important papers which are of special interest to the railways is given below.

### Phosphorus and Sulphur

#### Requirements in Steel

In connection with the presentation of the report of Committee A-1 last year it was stated that the committee had under consideration "the creation of a special committee to make a study of the influence of phosphorus and sulphur in steel and to determine whether the phosphorus and sulphur limits in the A.S.T.M. steel specifications are proper ones."

Accordingly the Committee on Steel recommended to the Executive Committee of the society that a thoroughly representative joint committee be formed consisting of representatives from those organizations and industries having a particular interest in the subject, and a joint committee was formally organized on November 29, 1919, the personnel of which includes George K. Burgess and H. L. Whittemore representing the Bureau of Standards, Washington, D. C.; F. M. Waring, engineer of tests, Pennsylvania Railroad, Altoona, Pa., and H. B. MacFarland, engineer of tests, A., T. & S. F., representing the American Railroad Association, Mechanical Section; Robert W. Hunt & Co., Chicago, and T. D. Lynch, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., representing the American Society for Testing Materials; E. F. Kenney, Midvale Steel Company, Philadelphia, Pa., and J. J. Shuman, Jones & Laughlin Steel Company, Pittsburgh, Pa., representing the Association of American Steel Manufacturers; J. E. McCauley, Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., representing the Steel Founders Society of America; and John H. Hall, Taylor Wharton Iron & Steel Company, Highbridge, N. J., representing the National Research Council. Mr. Burgess is chairman of the committee and C. L. Warwick, secretary-treasurer of the American Society for Testing Materials, Philadelphia, Pa., is secretary.

The tests to be conducted are divided into two series. Series "A" includes six groups of material each typical of their classes as to carbon and manganese, and with phosphorus and sulphur ranging from 0.02 to 0.08 per cent, it being understood that when studying the effect of sulphur, the phosphorus content is to be as nearly constant as possible and equal to the usual value for that group of material, and vice-versa. Also, the sulphur in the steels of this series is to be "residual sulphur," that is, sulphur present in the steel through fuel or from pig iron or scrap.

Series "B" is designed to provide for higher sulphurs than

can, generally speaking, be obtained as "residual sulphur." In this series, therefore, sulphur may be added during the later stages of manufacture. Any heats originally prepared for series "A" which run too high in phosphorous or sulphur may be diverted to series "B."

The tests planned in Series "A" are of more immediate economic importance, dealing as they do with the usual ranges of sulphur and phosphorus, extending in each instance up to limits which are not likely to be exceeded in ordinary practice. The tests under Series "B," however, are necessary in order to carry the tests, if possible, to a point where the material will unquestionably fail from the effect of higher impurities.

The Committee on Manufacture has supervised the manufacture of a number of tons of rivet steel, and will select all material which is approximately constant in chemical content as to carbon, manganese and phosphorus, with sulphur varying from 0.03 to 0.08 per cent. About a ton of material in each grade will be obtained, of which half will be submitted to the Committee on Tests and the remainder held in reserve for purposes of check tests. This material falls under group No. 1 of Series "A" tests. A beginning has been made in the tests of Series "B" by arranging with a large steel company for the manufacture of three heats of steel—covering plate and structural steels, forging steels, and wheel, tire and rail steels—from each of which eight ingots will be poured to obtain varying sulphur content from 0.04 to 0.15 per cent, by the addition of sulphur or iron pyrites in the pouring box.

A revision was proposed in the tentative specifications for steel tie plates by which the permissible variation in rolled width of plates with shoulders perpendicular to the direction of rolling was increased from 1-8 inch to 3-16 in. In the tentative specifications for plates for forge welding the minimum tensile strength for all plates was increased to 50,000 pounds per square inch and the carbon content for plates over three-fourths inch in thickness was raised to not over 0.20 per cent. The minimum manganese limit was also raised to 0.40 per cent.

### Specifications for Shipping Boxes

One of the most important reports presented at the convention from the standpoint of the railways is the work of Committee D-10 on shipping containers, which had worked in co-operation with the United States Forest Products Laboratory and a considerable number of manufacturers organizations interested in the manufacture of containers as well as the American Railway Express Company, the American Railroad Association and others. Specifications were submitted for "wooden boxes, nailed and lock-corner construction" which are presented below:

#### PROPOSED TENTATIVE GENERAL SPECIFICATIONS FOR WOODEN BOXES, NAILED AND LOCK-CORNER CONSTRUCTION.

1. These specifications are intended to apply to wooden boxes of nailed and lock-corner construction, and are directly applicable to the styles of boxes illustrated in Fig 1.

##### I. MATERIAL.

2. The lumber shall be thoroughly seasoned, that is, shall have an average moisture content of 12 to 18 per cent, based

on the weight of the wood after oven-drying to a constant weight.

3. All defects in the lumber that materially lessen the strength of the part, expose contents to damage, or interfere with proper nailing, shall be eliminated.

4. Ends, sides, tops, bottoms and other parts of a box shall be well manufactured and cut true to size.

## II. GROUPING OF WOODS.

5. The principal woods used for boxes are classed for the purpose of specifications into four groups, as follows:

Group I.: White pine, Norway pine, aspen (poplar), spruce, western (yellow) pine, cottonwood, yellow poplar, balsam fir, chestnut, sugar pine, cypress, basswood, willow, noble fir, magnolia, buckeye, white fir, cedar, redwood, but-

Width of face	Maximum number of pieces
5 in. or under.....	1
Over 5 to 8 in., incl.....	2
Over 8 to 12 in., incl.....	3
Over 12 to 20 in., incl.....	4
For each additional 5 in. in width of face.....	1*

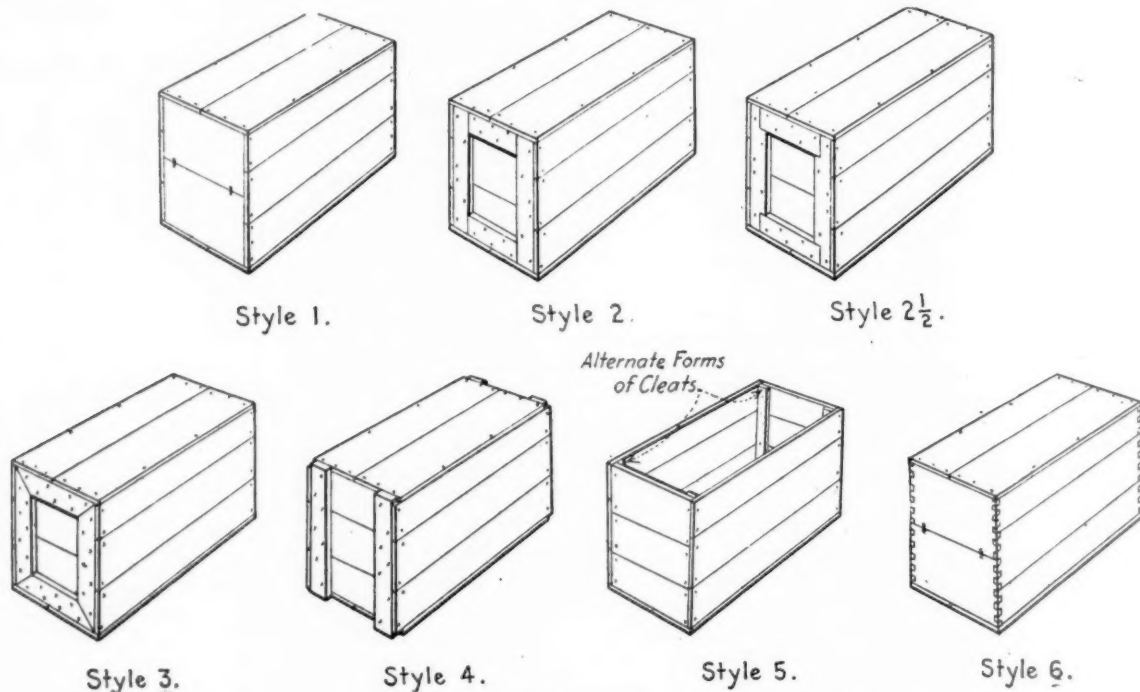
\*Additional piece may be used.

(b) Two or more pieces Lindermann-jointed shall be considered as one piece. No piece less than 2½ in. in width of face at either end may be used in any part, except for cleats or battens.

## IV. MANUFACTURE OF BOXES.

9. The outside surfaces of boxes shall be sufficiently smooth to permit of legible marking.

10. (a) Ends 1 in. or less in thickness, if made of two



Styles of Wooden Boxes, Nailed and Lock-Corner Construction

ternut, cucumber, alpine fir, lodgepole pine and jack pine.

Group II.: Southern yellow pine, hemlock, North Carolina pine, douglas fir, larch (tamarack).

Group III.: White elm, red gum, sycamore, pumpkin ash, black ash, black gum, tupelo, maple, soft or silver.

Group IV.: Hard maple, beech, oak, hackberry, birch, rock elm, white ash, hickory.

## III. DIMENSIONS OF PARTS.

6. (a) The thicknesses called for in specifications for boxes of any given commodity will, unless otherwise specified, be understood as applying to woods of Groups I and II.

(b) When the material is specified (for Group I and II woods) of the thicknesses indicated in the following table, woods of Groups III and IV may be used with the following permissible reductions in thickness:

Specified thickness of parts (Group I and II woods)	Allowable reduction in thickness if Group III and IV woods are used
¾ to 1 in., incl.....	⅛ in.
Over 1 to 2 in., incl.....	¼ in.

7. The permissible variation below the thickness of parts specified in Section 6 shall not exceed one-eighth of the thickness of the part.

8. (a) The maximum number of pieces allowed in any side, top, bottom or end of a box shall be as follows:

or more pieces, shall be either (1) butt jointed or matched and fastened with two or more corrugated fasteners; or (2) cleated.

(b) The size of corrugated fasteners to be used shall be as follows:

Thickness at ends	Size of corrugated fasteners
7/8 in. ....	1 by ¾ in.
¾ in. ....	1 by ¾ in.
¾, 1 1/8 and 1 1/4 in. ....	1 by ¾ in.

## Schedule of Nailing.

11. (a) All nails specified in these specifications are standard cement-coated box nails.

SIZE OF CEMENT-COATED NAILS FOR DIFFERENT SPECIES AND THICKNESS OF MATERIAL

(The sizes of nails are given in "penny.")

Species of wood holding nails	Thickness of ends or cleats to which sides, tops and bottoms are nailed, in.										Thickness of sides to which top and bottom are nailed, in.		
	¾ or less	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	Less than 1/2	1/2 to 1	1 to 1 1/4
Group I woods..	4	5	5	6	7	7	8	9	10	11	4	6	7
Group II woods..	4	4	5	5	6	7	7	8	8	9	4	5	6
Group III woods	3	4	4	5	5	6	7	7	7	8	3	4	5
Group IV woods	3	3	4	4	4	5	6	7	7	7	3	4	5

(b) If other than cement-coated nails are used, 25 per cent more nails shall be driven than specified for cement-coated nails. Plain nails driven through and clinched may be used for cleating.



12. The size of nails to be used is determined by the species and thickness of the material in which the points of the nails are held, and shall be in accordance with the table shown on the preceding page.

13. (a) The spacing of nails holding the side, top or bottom to the ends of a box shall be as follows:

Size of nails, "penny"	Space when side grain of end	Driven into end grain of end
6 or less.....	2 in.	1 3/4 in.
7 .....	2 1/4 in.	2 in.
8 .....	2 1/2 in.	2 1/4 in.
9 .....	2 3/4 in.	2 1/2 in.
10 .....	3 in.	2 3/4 in.

(b) The spacing of nails holding the top and bottom to the sides of a box shall be 6 to 8 in. When material in the sides is less than 1/2 in. in thickness, side nailing shall not be used unless otherwise specified.

(c) No board shall have less than two nails at each nailing end. Where cleats of thickness not less than the thickness of the ends are used, approximately 50 per cent of the nails shall be driven into the cleats.

14. Nails shall be driven flush.

(Over-driving of nails materially weakens the container.)

15. Specification to be supplied by the committee when the information is available.

### Unit Weight of Aggregates for Cement Concrete

Sub-committee VI of Committee C-9 on concrete and concrete aggregate presented a tentative method for determining the unit weight of aggregates for cement concrete, supporting this with the account of a series of tests of nine different methods which have been proposed at different times for this purpose. The problem involves the question of a standard method of filling or compacting the material placed in the measure of volume for the purpose of weighing and the nine methods included various schemes for filling and striking, jarring or tamping the material to obtain the standardized degree of concentration.

The method selected as the result of these tests, namely, the rod method which is the one covered in the specification, is described briefly as follows:

"Fill the measure one-third full, level off the top surface with the fingers, tamp with a pointed rod 25 times. Fill the measure two-thirds full and tamp 25 times. Fill the measure to overflowing, tamp 25 times. Strike off surplus aggregate, using the rod as a straight edge and weigh."

### Structural Douglas Fir

Committee D-7 on timber presented a revised tentative specification for structural Douglas fir which conforms substantially to the specification presented by the Committee on Wooden Bridges and Trestles of the American Railway Engineering Association in Bulletin No. 225 of that organization, which was reprinted in the *Railway Age* of March 18, 1920, page 915. The forms of the two specifications differ somewhat in that the latter was designed to cover both southern yellow pine and Douglas fir in a single specification and give particular reference to railway structural timbers, whereas the American Society for Testing Materials specification is general and covers Douglas fir alone.

### Cement

Committee C-1 on cement proposed that the society withdraw from standard specifications and tests for Portland cement, Section 36 on Permissible Variation in Fineness, which reads:

"A permissible variation of 1 will be allowed, and all

results in excess of the specified limit but within this permissible variation shall be reported at 22 per cent," such action to become effective on January 1, 1921.

### Gypsum

The increasing importance of gypsum as a structural material is noted in the presentation of a revised specification for gypsum and gypsum products, the present specification embodying extensive revisions from the tentative specification submitted by the committee last year.

### Effect of Tannic Acid on the Strength of Concrete By Duff A. Abrams

It has long been recognized that impurities of an organic nature have the effect of reducing the strength of concrete or entirely destroying the hydraulic properties of the cement. While this fact has been pointed out by a number of writers, there is still a tendency among concrete engineers to disregard the effect of such impurities. A general investigation of this subject was inaugurated in 1915 and has been continued during the past four years as a part of the investigations being carried out through the co-operation of Lewis Institute and the Portland Cement Association.

It was impossible to secure natural sands containing graduated percentages of organic impurities for a study of the quantitative effect of such impurities. Consequently, we prepared aggregate samples in which known quantities of organic impurities were present, by applying tannic acid as a surface coating in quantities up to 0.40 per cent by weight. Compression tests were made on 3 by 6-in. concrete cylinders. The mix varied from 1:5 to 1:2; the size of aggregate ranged from a fine sand to a 3/4-in. graded aggregate. Tests were made on all mixtures and sizes of aggregate at ages of 7 days, 28 days, 3 months, 1 year, and 2 years. Specimens were stored in damp sand. This series included about 2,000 concrete tests.

Following are the principal conclusions from this investigation:

1. It is believed that the results of these tests are typical of the effect produced by organic impurities in concrete.
2. The strength of concrete was reduced for all percentages of tannic acid, for all mixes and ages covered by these tests. Less than 0.1 per cent of tannic acid in terms of the weight of the aggregate may reduce the strength of the concrete to one-half its normal value.
3. Lean mixtures are more affected by tannic acid than the rich ones.
4. The mixtures from the finer aggregates are less affected by tannic acid than those from the coarser aggregates.
5. All of the effects mentioned above may be summed up by saying that the reduction in strength of concrete is a function of the concentration of tannic acid in the mixing water. An equation is given which represents this relation for the 28-day tests.
6. The results of these tests indicate that the wetter consistencies would be less affected by the presence of organic impurities than the drier ones.
7. The strength falls off rapidly for small percentages of tannic acid and less rapidly as higher percentages are reached.
8. The 7 and 28-day strengths are reduced to a greater extent by tannic acid than at ages of 1 and 2 years.
9. Some of the 1:5 mixes in which the higher percentages of tannic acid and the finer sands were used (2 to 3-per-cent solution) disintegrated before the time of test.
10. The tests confirm the results of many other investigations made in this Laboratory in showing the fundamental

dependency of strength of concrete on the quantity of mixing water as expressed by the water-ratio.

Care should be taken to eliminate surface loam from concrete sands. Loam can generally be removed by washing.

### Effect of Rodding Concrete

By F. E. Giesecke

Rodding concrete is accomplished by repeatedly pushing a pointed rod into the concrete, the direct effect being to expel entrapped air and excess water, and to compact the concrete; the indirect effect being a material increase in the strength.

The difference between tamping and rodding concrete is that, in tamping, the upper portion of the concrete is compacted and forms a cushion which protects the lower portion of the concrete and prevents or retards the escape of entrapped air and excess water, whereas, in rodding concrete, a pressure is exerted on the concrete as deep as the rod penetrates, and the escape of entrapped air and excess water is thereby facilitated.

Rodding concrete has an important bearing on the practice as well as on the theory of concrete construction. It is important in actual construction because, when generally applied, a considerable increase in the strength of the concrete or a corresponding saving in cement will be effected. With the ordinary 1:2:4 mix and as much excess water as is generally necessary in reinforced concrete work, thorough rodding will effect an increase in strength of about 100 per cent. The cost of the additional 100 per cent produced by the rodding is very much less than the cost of the original 100 per cent, and the consequent saving is considerable.

Rodding concrete is important in the theory of concrete construction because it has been shown that concrete can be rodded with beneficial effect long after the degree of hardening, known as the initial set, has taken place; this indicates that the hardening of cement paste is primarily due to colloidal action and not to crystallization, and that the fear of injuring concrete by disturbing it during the early portion of the hardening period is not well founded.

The beneficial effect of rodding was noted in a number of experiments made in 1917 by Mr. G. A. Parkinson, Assistant Testing Engineer, University of Texas. Since then, other tests have been made which demonstrate further the advantages of rodding concrete. In all the tests, it is conclusively demonstrated that rodding substantially increases the strength of concrete. In many cases this increase is more than 100 per cent. It is therefore seen that rodding has an important bearing on actual construction, either by increasing the strength of the concrete, or by effecting a saving in cement.

### Other Papers

C. H. Marshall presented a description of a new elastic limit recorder consisting of a very simple attachment to the standard testing machine. This consists in mounting on the poise of the testing machine, a card having graduations corresponding to the beam. This card moves in a horizontal direction in front of a punching device which is caused to move vertically at a speed proportioned to the elongation as shown by an extensometer attached to the test specimen. The record made is in the form of a series of punch marks which are the points for a stress-strain curve. These points are joined by a line drawn in by hand and the elastic limit determined on this curve. If desired, two or more cards may be placed in the machine and records made simultaneously.

James E. Howard, physicist, Interstate Commerce Com-

mission, presented a paper discussing the relation of the recently discovered interior shattered zones or regions of fine shrinkage cracks found in steel rails to the cause of transverse fissures in which he contended that these shattered zones might have some bearing on the subject, but were not necessarily a basic cause of the transverse fissures. The discussion was in substance the same as that presented in connection with the I. C. C. report of the derailment on the Chesapeake & Ohio near Hardware, Va., an abstract of which was presented in the *Railway Age* of May 21, 1920, page 1466.

### Freight Congestion and Embargoes

STRIKES HAVE AGAIN disturbed freight traffic on the Eastern Trunk Lines, and at the beginning of the week new embargoes had to be placed against shipments to or from many cities. In Philadelphia, Wilmington and Baltimore several hundred yardmen struck on Saturday the 19th and freight-switching was seriously impeded. These men were nearly all brakemen and were characterized as "bolters from the outlaws," having disregarded the advice or orders not only of the government, of their employers, and the officers of the regular brotherhoods, but also those of their new mushroom organization. Their only tangible grievance was that the governmental wage board, sitting at Chicago, was unreasonably slow in reaching a decision. The Governor of Pennsylvania took the part of the strikers to the extent of carrying their plea to Washington.

This strike-movement appeared in Syracuse, N. Y., New Haven, Conn., and a few other places; but by Tuesday the 22d, a considerable portion of the men had returned to work, or were asking for their jobs, and it was believed that the movement would very soon die out.

Representatives of the Chicago Yardmen's Association began agitation in Philadelphia about June 13. Several hundred men struck at the yards of the Philadelphia & Reading, including the Port Richmond coal terminal. On the Pennsylvania between 300 and 400 went out. At Baltimore the estimate was 500. At Syracuse about 200 men struck at the New York Central yards and less than one hundred at the yards of the Delaware, Lackawanna & Western.

At New Haven about 100 men left their work, or perhaps 15 or 20 per cent of the whole force.

Embargoes were at once announced on all freight, except perishables and live stock; but road service was not badly affected and a large percentage of freight movement was kept up in spite of the disturbances.

Several hundred former yard men—those who struck more than a month ago, and who are still out—held a meeting in Jersey City on the 22nd and gave out the usual newspaper statements threatening trouble; but it does not appear that any of the yards around New York City were at all affected.

There was a small strike in the yard of the New York Central at New York City on the 22nd, but this seems to have made little trouble; and the officers of the road said that there was nothing unusual in connection with their freight traffic except at Syracuse; and there the percentage of men out was small.

The New Haven road reported on Tuesday night, that the men who struck on Monday, the 22nd, had largely returned.

In Philadelphia on Tuesday officers of the Pennsylvania said that about 1,100 men were still absent from their yard forces, but that, with the aid of volunteers, 100 crews were at work, out of a total normal force of 118 crews. No enginemen or firemen had struck. At Baltimore yard serv-



ice was 75 per cent normal. At Wilmington the strikers had all returned to work on Tuesday.

The situation at New York City has been slowly improving, the Citizens' Transportation Committee having increased its forces for moving freight from the steamship piers where the union truckmen have combined with the striking longshoremen to keep up the blockade of freight. The new strike of yardmen at other cities had, however, helped to delay freight movements and the shortage of coal for street railways and lighting companies in New York had by the 22nd become acute. The New York State Public Service Commission, First District, sent a representative to Washington to ask President Wilson to order priority for coal shipments.

The Citizens' Transportation Committee had in service last week 65 automobile trucks. These trucks were used mainly to carry freight to and from the docks of the coastwise steamships. One lot of cotton, 16 truckloads, was carted from the Morgan Line at Pier 49, North River, to Mott Haven, about seven miles, for shipment to New England over the New York, New Haven & Hartford, this to get around the difficulty of transferring by strike-ridden lighters, which is the usual means. The Morgan line piers have been so badly congested that six of the company's vessels, loaded with 36,000 tons of freight, have been waiting from thirty to sixty days, with still no prospects of unloading.

About 200 captains in New York Harbor lighterage service who had been on strike in sympathy with the longshoremen returned to work last week.

On Wednesday the 23rd, the president of the Merchants' Association declared the longshoremen's strike surely lost. On that day a second independent non-union trucking concern took a large quantity of freight from one of the steamship piers.

At Baltimore the congestion was so great through the first two weeks of June that the Baltimore & Ohio on June 14 placed an embargo on all inbound shipments for export, except coal, and on the 17th coal was included. The Baltimore & Ohio issued a statement calling on the coal shippers to get together to discuss the situation and to seek some remedy which would insure prompt movement of coal from the Curtis Bay piers of the company. At the date of the statement there were at Curtis Bay and standing outside within terminal limits 1,785 carloads of coal awaiting transshipment over the piers, while west of Baltimore and set off at various points and terminals were 2,749 additional cars, a total of 4,534 cars. "There would seem to be no reasonable excuse," said the statement, "for this one port having 4,534 loads of coal crowding it when vessels are available in all directions, some of which have lain in the port of Baltimore as much as 30 days awaiting coal. The coal was here, but shippers for some reason did not or would not pool it to an extent sufficiently flexible to increase the dumping and thereby increase the number of cars available for distribution at the mines."

At Newbern, N. C., last week the shortage of coal was so serious that the officers of the city issued a general appeal, for wood fuel, the city lighting plant having nearly emptied its fuel bins.

At Boston the export movement of grain is said to have entirely ceased and many steamers scheduled to sail for Europe have had to be sent to other ports for loads.

### President Urges Labor Board

President Wilson has sent a telegram to Chairman Barton of the Railroad Labor Board urging the importance of an early decision, it was announced at the White House on Wednesday, after W. N. Doak, vice-president of the Brother-

hood of Railroad Trainmen, had called and discussed the labor situation with Secretary Tumulty. Mr. Doak later gave out a statement placing the blame for the strikes on the delay of the board in reaching a decision and declaring that the method of adjudicating labor disputes provided in the transportation act so far is "a rank and hopeless failure."

### Labor Board Trying to Expedite Decision

Although press reports from Washington stated that President Wilson has asked the Railroad Labor Board to make an immediate award in the present wage controversy to allay the unrest among the railway employees, Judge R. M. Barton, chairman of the board, announced that no communication had been received from the President late Wednesday evening. In addition, Judge Barton stated that the board was doing everything possible to expedite its decision, citing the mass of evidence that has been presented, and the necessity for digesting this material before arriving at the final award. The board is holding executive sessions every day. However, it has been intimated several times that the award will not be ready for at least two weeks.

The unrest among yardmen in the East has not spread to Western points and the majority of these workers are patiently awaiting the award of the Labor Board.

John Grunau, president of the Chicago Yardmen's Association, and Harold E. Reading, president of the United Enginemen's Association, the two organizations whose men started the recent switchmen's strike, have called a meeting for Friday night "to give the public the actual truth about the situation." Grunau has also wired President Wilson asking that the outlaw organizations be recognized when the final award of the Labor Board is made.

### B. & O. Passing Report

WITH A VIEW to furnishing prompt replies to inquiries from shippers and consignees concerning the movement of freight, and to facilitate measures for discovering and preventing delays, the Baltimore & Ohio has adopted a new passing report, to be used at all important terminals and division points. By this report information concerning the movements of individual cars (from each reporting point) is in the hands of the freight department officers of the road at all important cities and junctions within 24 hours (or less) after the filling out of the report. Reports are made up each evening.

The sheet on which this report is made is 21 in. wide and 24 in. high, and the portion shown in the illustration (reduced) is about 11 in. wide and 6 in. high. Each report is made for a 24-hour period ending at 3 p. m. and the one illustrated is for January 27. This was the second and last sheet of the record for that station for that day.

The passing report is primarily for the traffic department, but it serves the transportation department equally well. It becomes the basic record of the yards and terminals which compile it, in place of the large index record books. It is, in fact, a loose-leaf car record of great elasticity and contains more "wheel report" information than it is possible readily to enter in the index books.

There are 100 squares in the form, numbered from 00 to 99, each square accommodating ten car initials and numbers. The printed numbers in the squares denote the last two figures of a car number ending with those particular figures. The recording clerk does not enter the last two figures of a car number, the terminating figures in the squares supplying that information. If a number has six figures in it, only the first four are entered; if it has five figures, only the first three are entered; if four, only the first two; if three, only the

first figure; if two, nothing but the initial is entered; and if there is only one figure in the car number it is written out in full; for example "Three" in the 03 square.

The train and engine, name of conductor, time and date of departure and destination of the first train for the 24-hour period, are written on the first line at top of the sheet, which is prefixed by the code letter "A." Then, as each car number and initial on that conductor's report are entered in the squares, corresponding to the two terminating figures of the car numbers, such car number is prefixed, on the same line at the left, by the letter "A." The next train is written up on the "B" line at the top and all its car numbers are prefixed in the body of the report by the letter B; and so on. While it is desirable that trains be entered at the top in the order of their departure, this is not essential, for any one locating a car looks first for the indexed figures, and the train and time afterwards.

they are laid face-down on a duplicating machine for two or three minutes and then removed, and then blank sheets of paper of the size of the "master sheets" are laid on the same surface, one at a time, until the required number of copies are taken. At present about forty-five copies are required to fill the mailing list and to provide sufficient office copies. The mailing list comprises all freight traffic department offices on the system, the superintendent of Car Service, and as many offices local to the point of compilation as have occasion regularly to call upon the divisional car record office for records.

For the most part these reports close about 3 p. m. and they reach about seventy-five per cent of the addresses by or before 10 o'clock the following morning. When it is considered that a record of all loaded cars forwarded from a point like Brunswick or Connellsville or Grafton for twenty-four hours up to 3 p. m. one day, is in the hands of inter-

BALTIMORE AND OHIO RAILROAD

EASTERN LINES

WESTERN LINES

Passing Report of Loaded Cars Forwarded from Phila, Pa (East Side) Yard, for the 24 Hours Ending

CODE	TRAIN	ENGINE	CONDUCTOR	DEPARTED	TO	CODE	TRAIN	ENGINE	CONDUCTOR	DEPARTED	TO										
A	297	4016	McNeil	5.28 P.M. 1/26	Brunswick	I	Local	1325	Larkins	10.59 A.M. 1/27	Local										
B	41	4543	Lott	7.22 P.M. 1/26	Washington	K	187	4269	Litchfield	10.50 A.M. 1/27	Brunswick										
C	41	4527	Hampton	9.28 P.M. 1/26	Lancaster	L	Bray	353	Lewis	8.30 P.M. 1/26	P.R.										
D	41	4587	Offet	11.53 P.M. 1/26	Lancaster-Mt. Clare	M															
E	41	4028	W.B. Morris	12.55 A.M. 1/27	Bay View	N															
F	41	4598	James	2.29 A.M. 1/27	Brunswick	O															
G	41	4033	J.B. James	6.00 A.M. 1/27	Wilmington	P															
H	41	4518	Brilliant	9.35 A.M. 1/27	Wash.-Pot. Yd.	R															
CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.				
I	CA	13400	A	NC	812	29801	A	CE	52002	I	PR	5003	C	PR	37804	C	NYC	341605	A	NYC	341605
I	CNG	846	B	RD	460	C	NYC	3489	F	KM	50	H	LC	672	H	CM	5053	B	NYC	341605	
F	PRR	1546	I	RL	404	C	PRR	3813	F	PL	7428	C	CNG	607				I	NYC	341605	
		1000	E	PR	761	C	NYC	360	F	Erie	525	K	WJL	319				I	NYC	341605	
			F	Erie	319	F	PL	6831													
			F	PRR	1964																
			H	Erie	1000																
			K	Boy	3016																
			L	PL	8703																
H	CA	27510	B	JUE	140811	A	Erie	90412	A	NP	97213	C	PU	19574	C	PR	32515	B	NYC	341605	
L	WP	1243	C	PRR	2965	C	BO	1326	F	LN	563	E	PRR	1633	H	BO	1720	F	NYC	341605	
			I	CNG	359	I	PRR	3845				K	814	534	C	PR	278	H	NYC	341605	
			I	CB	1154	K	WJL	66				K	WJL	317	K	WJL	312	I	NYC	341605	
			K	4288	285																
			L	OC	47																

Part of Baltimore & Ohio "Passing Report" of Freight Cars

Suppose a consignee at Louisville has had several cars shipped to him from New York; he goes into the division freight agent's office at Louisville, and gives him the car numbers. Suppose for example, that N. C. St. L. 29801 is one of the cars. The division freight agent calls for the passing reports from Philadelphia, and, glancing at the square in the report ending in "01" immediately locates his patron's car, noting that this car is prefixed by the letter "A." He finds, at the top of the sheet that this car left East Side, Philadelphia, on Train 2nd No. 97, at 5.28 p. m., January 26, for Brunswick, and, of course, is in a position to give this information to the consignee "right off the bat." The consignee is satisfied that his cars are rolling. A day or two later he may find from the passing reports from Brunswick that his cars have left that point. Later on the passing reports from Grafton and Parkersburg will show the passage of the cars through those terminals, and so on until they have passed through Cincinnati. When a car is empty the number is followed by a dash.

These forms are printed in duplicating ink and are termed "master sheets." All wheel report information is written on them in duplicating ink; when the sheets are completed

ested officers several hundred miles away the following forenoon, some conception of the value of these reports to the Freight Traffic Department may be had.

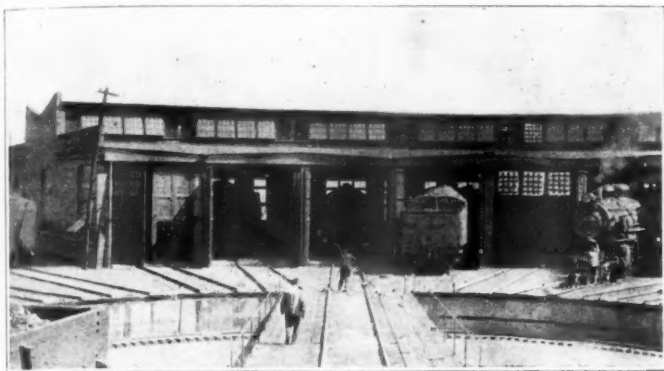
These reports are now made at Philadelphia, Brunswick, Connellsville, New Castle Junction, Wheeling, Grafton, Parkersville, Willard and Cincinnati, and will soon be extended to other points. Frederick C. Syze, supervisor of transportation, from whose description in the Baltimore & Ohio Employees' Magazine this information is taken, says that the results so far obtained from the reports are very gratifying. There has already been a considerable decrease in the demands previously made upon car record offices for car information.

The clerks had long been accustomed to quickly jotting down car information in the books in lead pencil, but when it came to carefully writing more complete information in duplicating ink on these forms, they found the task quite different. But they soon succeeded in turning out most creditable work; not having to turn continually the pages of a large book (for practically every entry) went a long way towards offsetting the slightly longer time required to make the entries on one sheet in ink.



## An Engine House for Mallet Compound Locomotives

IN ORDER TO PROVIDE adequate facilities for the housing of Mallet Compound locomotives it has been necessary for many railroads to enlarge their roundhouses in order to secure greater track space and longer engine pits within the structure, or to design and construct separate enginehouses especially for this class of locomotives. One of the latest structures resulting from this condition has recently been



Partial End View Showing Ventilating Features

completed by the Chesapeake & Ohio at its Fulton terminal, Richmond, Va.

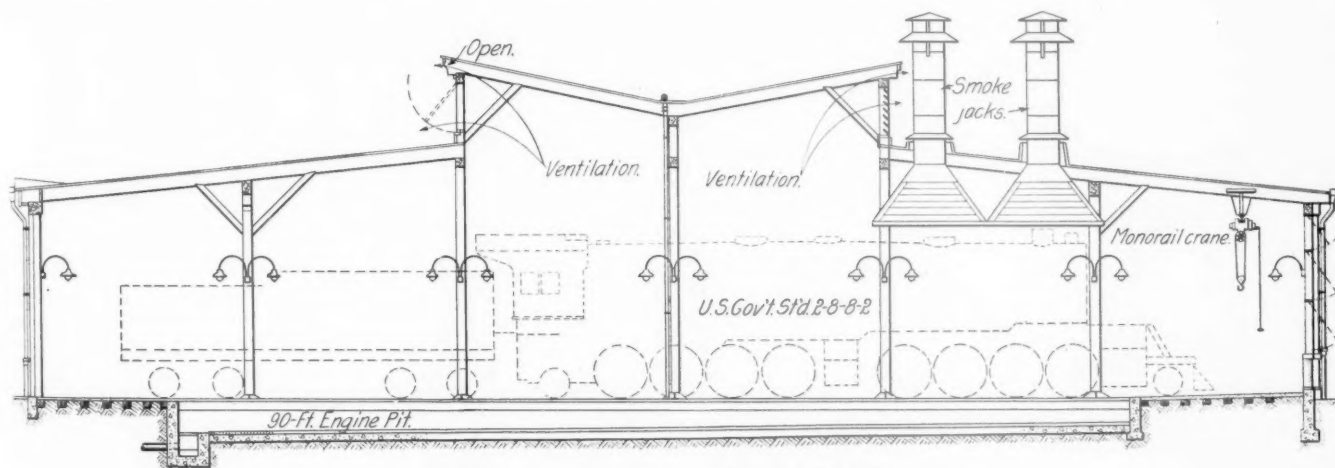
The new 8-stall roundhouse built at this point has a total depth of 120 ft. from the center of the columns on the inner circle to the inside of the wall at the back or outer circle of the building. It was constructed upon concrete foundations with concrete engine pits 90 ft. long and a floor of the same material. The outer or back wall is also concrete, with the exception of the panels radially opposite the end of each engine pit, which consist of brick walls 12 ft. wide and 9 in. thick, this type of construction being used in order to reduce the cost of replacing the walls in case a locomotive should run through the building. The superstructure was built of

occupying two-thirds of the space on one side and three-fourths on the other, the remainder being fitted with wood louvres.

A free passage was obtained for the smoke and gases along the underside of the roof decking towards the monitor by laying the roof purlins radially throughout the building, with the roof sheathing laid crosswise on them, thus eliminating any pockets which would hold or retard the smoke. The space between the top timbers over the monitor and underneath the roof decking and between the rafters or purlins was left open on both sides of the monitor to give a free outlet to the atmosphere. Any wind blowing across the roof thus creates, to a certain extent, a condition similar to that produced by a large ventilator, and this, together with the action of the two cast-iron smoke jacks which have been installed over each engine pit, has been found to carry the smoke and gases from the building satisfactorily, improving the natural lighting diffused from the windows.

The roundhouse doors are of a heavy design, constructed of wood and thoroughly reinforced with heavy iron hinges and trussed rods to prevent sagging. Substantial iron locking devices are provided to secure the doors in either the open or closed position, the device for holding the doors in an open position consisting of a rail vertically imbedded in concrete and stiffened at the top by iron braces extending from the building. In addition each door is provided with three wood blocks or bumpers and a heavy iron automatic latch, so arranged that when the door is opened against the bumpers it is securely locked and held in an open position. Any tendency to twist or warp, or any danger of its swinging shut in front of a moving locomotive and being damaged thereby, is thus eliminated. The upper section of the door is provided with windows with  $\frac{1}{4}$ -in. glazed rough wire glass.

The drainage from the roof is carried to underground sewers through iron downspouts. Where they are within the building, a convenient clean-out has been provided at the foot of each to permit flushing the sewers in case they should become clogged. The water, steam, air and boiler washing piping was installed in the usual manner, the pipe lines being supported from the columns and roof purlins. The main electric light wiring was carried outside of the building in



A Cross-Section of the 120-ft. Enginehouse

timber throughout, covered with a 2-in. wood-sheathed roof decking supporting a built-up asphalt slag surface roofing. The window sash installed in the ends, walls, back walls and monitors were of wood, with  $\frac{1}{8}$ -in. glazed rough glass, the top and bottom sections in the outer wall being top hung and provided with mechanical operators, permitting them to be opened from the floor. In order to aid the ventilation, mechanically-operated sash was installed in the monitors,

conduits, the branch wiring running across the building being laid in the concrete floor, with risers at the columns extending to the lamp fixtures, which are attached to the columns. In this way the deterioration of the conduits and their subsequent and frequent replacements due to the destructive action of the gases ordinarily found in roundhouses was reduced to the minimum. An installation of a 2-ton monorail electric traveling crane, running on an I-beam track extending around the

rear of the building and on through into the adjoining machine shop provides a means for conveying heavy parts between the machine shop and any locomotive in the round-house upon which running repairs are being made.

The design of the enginehouse was developed by the Arnold Company, Chicago, working in conjunction with the motive power department of the Chesapeake & Ohio, the Arnold Company having charge of the engineering and the construction of the building itself.

## Prussian-Hessian Railways' Financial Position

By Robert E. Thayer

European Editor of the *Railway Age*

**I**N A RECENT ARTICLE on the railway situation in Germany (*Railway Age*, April 16) reference was made to the heavy deficits on the Prussian-Hessian railways and to the fact that all rates (freight and passenger) had been increased 100 per cent on March 1. Since that article was written more definite and authoritative information has been received.

The rates for freight and livestock on the Prussian-Hessian system have been repeatedly increased since the outbreak of the war. A 7 per cent tax was put into effect in August, 1917. Since then there have been four increases; one of 15 per cent on April 1, 1918; 60 per cent on April 1, 1919; 50 per cent on October 1, 1919, and 100 per cent on March 1, 1920. When the 50 per cent increase was made last October it was stated that to balance a deficit of 3,456,000,000 marks it would be necessary to double the revenues. Not wishing to place too heavy a burden on industry, and, moreover, as it was not deemed impossible that the conditions might improve, an increase of only 50 per cent was made.

The expectation that the financial condition of the railroads would improve has not been fulfilled. In consequence of the continued increase of prices for material and salaries both of officers and workmen, also because of the decline of the individual working power, and finally because a scarcity of coal and locomotives hampered the development of traffic (in October, 1919, passenger traffic was stopped altogether for 10 days), matters have been going from bad to worse.

An estimate for the year of 1920, made up in accordance with the results obtained in the last 10 months of 1919, shows in millions of marks the amounts set out below. Under normal exchange the mark is valued at 24 cents, but at this writing it is quoted in New York at 2.06 cents, or about one-twelfth its former value.

ESTIMATES FOR YEAR 1920	
Revenues, passenger .....	1,685
Revenues, freight .....	3,716
Income from various sources .....	193
Total for the year 1920 .....	5,594
Annual expenditures for operating the railways were estimated in December, 1919, at .....	7,140
In consequence of increases made in January, 1920, this sum had to be increased as follows:	
(a) New rate of wages for workmen beginning with January 1, 1920 .....	1,200
(b) One hundred and fifty per cent increase on extraordinary payments to railroad officers and for pensions to meet high cost of living .....	900
(c) Increase of contributions to pension fund .....	40
(d) Increase of coal prices and increase of prices for water, gas, electricity and oil .....	580
(e) Enormous advance of prices for iron materials and increased prices charged for car repairs done in private shops .....	1,380
Total expenses .....	11,240
Total revenues estimated as above .....	5,594
Result: A deficit of .....	5,646
This deficit is increased by:	
(a) Payments on railroads' debt for the year 1920 (interest and redemption) .....	888
(b) Allowance for extras for the year of 1920 .....	164
Total deficit for 1920, millions of marks .....	6,698

The estimate dealing with the revenue is on a very optimistic scale, and the expenses will certainly be much higher than given above, owing to the continued advance of prices for all things, especially for coal. The new wage scale for officers, which has been insufficiently estimated at 900,000,000 marks, will also burden the expense column considerably.

The foregoing gives the causes that are leading to a further decline of returns made by the Prussian-Hessian System. Marked improvement of these conditions can be expected in the near future. On the other hand, it was not deemed justifiable to burden the taxpayer with the obligation to meet the deficit in the financial returns of the state railroad.

It is estimated that the recent increase of 100 per cent on the rates for freight and livestock and passengers\* will, under the most favorable circumstances, provide 5,400,000,000 marks of the estimated deficit of 6,700,000,000 marks which has to be balanced. To this sum further expenses, as mentioned above, will have to be added. An attempt will be made to balance these sums through rigid economy and by

TABLE I—FREIGHT RATES FOR A TON-KILOMETER (IN PFENNIGS)  
Piece goods class (l. c. l.)

Distance carried	Express freight		Ordinary freight	
	General	Special class	General	Special class
Up to 300 kilometers .....	121.44	60.72	60.72	49.68
From 301 to 400 kilometers .....	110.40	55.20	55.20	44.16
From 401 to 500 kilometers .....	99.36	49.68	49.68	38.64
From 501 to 600 kilometers .....	88.32	44.16	44.16	33.12
Over 600 kilometers .....	66.24	33.12	33.12	33.12

Note—One kilometer = 0.62 mile.

One ton-kilometer = 0.685 ton-mile.

One pfennig = 0.25 cent (standard rate of exchange).

To change pfennigs per ton-kilometer to cents per ton-mile multiply by .1644 or roughly  $\frac{1}{6}$  (standard rate of exchange).

the cutting down of expenses in other places. For this purpose it is intended that special commissions will be attached to the various railroad administrations to examine where and by what means expenses may be cut down, and further increases of rates must be expected in the near future.

The new uniform rates for goods traffic are shown in Tables I and II. In carload lots the rates per ton-kilometer vary, according to the different classes, from 36.984 pfennigs to

TABLE II—FREIGHT RATES FOR UNITS OF 100 KILOGRAMS (IN PFENNIGS)  
Special rates for express goods

Distance carried	General rates for express goods		General car loads		Special car loads	
	General	Special	General	Special	General	Special
From 1 to 10 kilometers .....	110.40	55.20	44.16	32.12	32.12	32.12
From 11 to 20 kilometers .....	121.44	60.72	49.68	32.12	32.12	32.12
From 21 to 30 kilometers .....	132.48	66.24	55.20	32.12	32.12	32.12
From 31 to 40 kilometers .....	143.52	71.76	60.72	32.12	32.12	32.12
From 41 to 50 kilometers .....	154.56	77.28	66.24	32.12	32.12	32.12
From 51 to 60 kilometers .....	165.60	82.80	66.24	49.68	49.68	49.68
From 61 to 70 kilometers .....	176.64	88.32	66.24	49.68	49.68	49.68
From 71 to 80 kilometers .....	187.68	93.84	66.24	49.68	49.68	49.68
From 81 to 90 kilometers .....	198.72	99.36	66.24	49.68	49.68	49.68
From 91 to 100 kilometers .....	209.76	104.88	66.24	49.68	49.68	49.68
Over 100 kilometers .....	220.80	110.40	66.24	66.24	66.24	66.24

Note—100 kilograms = 220.4 lb.

1 kilometer = 0.62 mile.

1 pfennig = 0.24 cent.

12.144 pfennigs, or from 6.077 to 1.996 cents per ton-mile, regardless of the distance traveled. The increase in rates, though it is a large one, will have to be borne, and it is believed that it can be borne, particularly as all prices for living and for all necessities both in Germany and in the markets of the world have climbed up to a much higher average. The results from the last increase of tariff rates have, speaking from a financial point of view, not been unfavorable.

All other German states in possession of the State railroads have made similar advances in rates.

\*The increase in passenger rates per 100 kilometers is as follows:  
INCREASES IN PASSENGER FARES

	Pre-war, marks	Today, marks	Percentage increase
First class .....	7.80	54.00	693
Second class .....	4.70	24.00	510
Third class .....	3.10	14.80	478
Fourth class .....	2.00	8.10	405



# Hearing in the General Rate Advance Case

## Testimony as to Individual Commodities Principally Confined to Question of Percentage or Specific Advance

WASHINGTON, D. C.

COMPETITIVE CONDITIONS in the various industries and conflicts of interest between differently situated shippers as to the method of applying an advance in freight rates have taken the place of discussions of transportation conditions and the finances of the railroads at the hearing before the Interstate Commerce Commission in the general rate advance case. The testimony during the past week or so has been devoted to the rates on particular commodities, and while it has brought out practically no opposition to a general advance in rates, has brought out differences among the shippers as to whether the advance should be made on a percentage basis or whether it should be on the basis of specific increases in cents or a percentage with a maximum in cents. Generally the shippers who have the shortest haul to the markets favor a percentage basis, while their long-haul competitors object vigorously to such a method and ask for the preservation of existing differentials in cents or a maximum. Most of the shippers who have given testimony as to special commodities have also given reasons why they believe their industry should receive special consideration and be subjected only to a minimum advance.

In most cases when the counsel for the railroads have asked if their prices have not been increased by much greater percentages than the freight rates it has been admitted but the witness usually has some reason as to why any further increase would give his business to a competitor.

Henry Jones Ford, the new member of the commission under a recess appointment, took his place at the commission's bench on Monday, but the other recess appointees have not yet taken the oath of office. James Duncan was re-elected first vice-president of the American Federation of Labor at its Montreal convention last week.

Commissioner Robert W. Woolley, who during the past year or so has made many speeches expressing concern as to the effect of an increase in freight rates on the cost of living, has been conspicuous by his absence from the hearing for several days. It is reported that he is making an inspection of the Western Pacific as a member of the compensation board that is to report on the amount of its just compensation for the use of its property by the government during federal control. Before his departure in the direction of San Francisco Mr. Woolley's chief interest in the hearing, as indicated by his questions, seemed to be in cross-examination of witnesses who seemed to make any reflection on federal control.

### Grain and Livestock

Testimony regarding the rates on grain and grain products was heard on June 17. Clifford Thorne, representing the National Farmers' and Grain Dealers' Association, made a brief statement, saying that the freight cost of the initial shipment of grain from the farm to the primary market is borne by the producer. He asked that instead of a percentage advance the increase on grain be limited to a maximum of 6 cents per 100 lb., as in General Order No. 28. He also objected to the proposal to put all of Illinois territory into the eastern district where it would be subject to a 30 per cent advance as compared with 24 per cent for the western district, and he asked that market relations be preserved. Testimony of other witnesses on grain dealt largely with questions pertaining to the relative adjustment of rates.

Representatives of the live-stock shippers pictured their industry as in much the same condition as that of the railroads, and entitled to special consideration. Some of them

attributed their condition to too much government control during the war. While not objecting to a general advance in freight rates, they criticised the railroads for inefficiency and declared that live-stock could stand only a minimum advance, if any.

A. Sykes, president of the Corn Belt Meat Producers' Association, said his returns from his farm at Ida Grove, Ia., last year were only 3 per cent on a fair cash value of his property. He said the railroads would earn additional revenue when they handle all the business that has been delayed by lack of cars, and while the railroads need an increase in rates the live-stock industry is already overburdened and should be protected. He said something is wrong with the railroad service and he didn't know just what is the matter, but that the shippers feel that if they were in charge they would "put it over or quit."

When Mr. Thom referred to Mr. Sykes' recent testimony before the Senate committee, urging that Congress appropriate an additional loan fund to enable the roads to acquire more cars, Mr. Sykes said the government should have financed the railroads until they were put in good condition instead of placing the burden on "a few of us who cannot pass the buck." He admitted that since the government has not financed the railroads the problem still remains and must be worked out. He also admitted that one of the great problems before the country is the restoration of the proper relation between production and distribution, but he referred to it as a problem "for the railroads." He said he knew of no reason why the railroads could not have postponed dividends and purchased equipment.

W. E. McCornack, on behalf of interior Iowa packers, said that the maximum of 7 cents applied on live-stock by General Order No. 28 when the rates of live-stock products were increased 25 per cent, had destroyed the relation between live-stock and products to the Atlantic coast and he asked that the commission now readjust the rates by adding 25 per cent to those in effect prior to General Order No. 28, and then applying whatever percentage is determined upon in this proceeding.

E. B. Spiller, secretary and general manager of the Cattle Raisers' Association of Texas, said he was not asking that there be no advance on live-stock, but that in the case of a commodity sold at less than the cost of production the increase should be the absolute minimum which the commission finds necessary.

A. H. Mercer, president of the National Livestock Shippers' League, said that transportation is the very life of the live-stock industry but that the railroads are also very largely dependent upon the live-stock traffic. He said the live-stock industry under the control of the Food Administration had sustained greater losses than had the railroads, because the railroads were guaranteed, and that it is now more difficult to finance it even than it is to finance railroads. He thought the government should loan money to rehabilitate the railroads before allowing any increase in live-stock rates because of the precarious condition of the industry.

R. D. Rynder appeared on behalf of the Swift, Morris, Armour, Wilson and Cudahy packing companies, not to oppose an advance in rates, but to say that they would want to be heard on the subsequent adjustment of rates to preserve relationships.

The shippers of sand, gravel, cement, building stone, brick, etc., who appeared on June 18 and 19, had very lit-

tile to say regarding a general advance in rates but asserted that these commodities could not sustain more than a minimum increase because of their low value. It was stated that the present rates on sand and gravel are approximately the equivalent of the cost of the raw materials and that any addition would so increase the price as to hinder building operations and highway construction. The sand and gravel representatives also objected to the proposal for giving preference in the use of open-top cars to coal, unless a discrimination is made between essential and non-essential uses of coal.

#### Sand, Gravel, Cement, Etc.

V. O. Johnston, president of the National Association of Sand and Gravel Producers, attracted particular attention to his industry by reading a long statement of the history and uses of sand written in such a way as to furnish some entertainment in the course of what has come to be rather a tedious proceeding. He said the price of his product was less than the profit on coal and asked who ever heard of a "sand king" or a "gravel baron." He said that car supply is vital to his business and is the most uncertain element in it but that a rate advance would be disastrous. One of the cement shippers said he would not object to an increase in the rate on his product nor on many of the commodities which he buys, but said he would have to go out of business if there is an advance on his principal raw materials.

B. L. Glover, of the Iowa Cement Mills Traffic Association, said he was not opposed to an increase in rates for the carriers but that any increase on cement should be made by specific amounts instead of a percentage.

W. E. McCornack, on behalf of the Indiana building stone interests, asked that the increase on this commodity be made 2 cents instead of a percentage increase, and F. B. Dow, on behalf of the terra cotta interests, said they would ask that the same method of increase be applied to terra as to stone.

Representatives of the brick and tile shippers seemed more concerned with the competitive adjustment of rates. One asked that no increase be allowed until the preservation of relations has been worked out in advance and another that any increase be postponed until after the commission completes its investigation in a pending case involving the general adjustment of brick and tile rates.

Testimony on cement rates was continued on June 21, when traffic managers of three large cement companies were heard. F. E. Paulson, general traffic manager of the Lehigh Portland Cement Company, urged a flat advance instead of a percentage, saying he was not opposing any increase but that the short haul mills could shut out the competition of the long haul mills if the differentials were increased. F. T. Bentley asked if he was not making the assumption that an increase in rate necessarily affects the selling price regardless of the way prices are actually made. The witness said he was not familiar with the making of prices. When the witness referred to the demand for cement for road-building, Commissioner Aitchison asked if there had not been a persistent propaganda on the part of the Association of Portland Cement Manufacturers to induce the use of cement for road-building in spite of the fact that there is a car shortage. He said the commission had received hundreds of telegrams urging the claims of the road-building interests which had been inspired by the cement manufacturers.

Walter Young, general traffic manager of the Atlas Portland Cement Company, supported the application of the carriers for a percentage increase on cement and said that while the cement rate structure needs many adjustments, the railroads are in such dire need that they ought not to be compelled to await the readjustment. He said the flat

increase made by General Order No. 28 had resulted in great injustice to many of the cement companies and he thought commercial relations could be more nearly preserved by an attempt to maintain differentials in cents. He said a percentage advance tends to result in the supplying of a commodity from points having a short haul and thereby in the conservation of equipment and he expressed the opinion that the present shortage of cars is due partly to the fact that the rate structure encourages long haul shipments. He said the railroads have made subnormal rates from the Lehigh cement district which have enabled the shippers in that district to compete with mills nearer the point of consumption that are operating at less than capacity. He said he had asked the Railroad Administration to apply the interstate scale to state traffic, but it had declined and his company has now asked such rate adjustment in Illinois and proposes to make a similar application as to all western states.

F. E. Guy, traffic manager of the Universal Portland Cement Company, said he was in favor of an advance in freight rates, the amount of which he was willing to leave to the commission, but that his company felt it should be spread equitably over the entire industry on a percentage basis. He said railroad officials have told him that by the 15 per cent case and the general advance made by the Railroad Administration the subnormal rates had been brought up so that it would now be fair to apply a percentage advance.

#### Oil

The presentation of testimony on oil rates was begun by F. M. Swacker, representing seven of the largest western oil refining companies who are located near points of water shipment and therefore do business on a short rail haul and who are in favor of a percentage advance and thought that 4½ per cent arbitrary advance made by the Railroad Administration in place of the 25 per cent advance at the request of Clifford Thorne was "all wrong." Mr. Swacker put on several witnesses who gave similar testimony in favor of the percentage advance.

F. B. Dow, on behalf of the National Petroleum association, presented as a witness, F. W. Boltz, traffic manager of the association, who said he was speaking for 51 refining companies in the east, who are members of that association, and are opposed to the percentage advance urged by other members represented by Mr. Swacker. His principal point was that a percentage advance works to the disadvantage of the independent refineries who ship by rail from their refineries located near the point of oil production in competition with the Standard Oil Company that uses pipe lines to its refineries and has a short rail haul. While he did not oppose any increase in rates, he said he would not concede that the railroads are entitled to an increase on petroleum or its products, which have sustained very large advances since 1907 and, in his opinion, are already standing more than their proportion of the cost of transportation. He favored a percentage advance with a maximum which would limit it to a nominal amount.

When Mr. Thom asked the witness whether his price had increased by a greater percentage than the freight rates, Mr. Boltz said he was not familiar with prices, but that the price of crude oil has increased 400 per cent since 1907. Mr. Dow filed as an exhibit a report on the price of petroleum products, saying that most of the independent refiners are not producers and have to pay the high prices for crude oil, while the prices of their products show that they have not fully absorbed the increased cost of the crude oil.

Clifford Thorne presented a statement on behalf of 412 independent western refining companies favoring a flat increase or at least a maximum if a percentage increase is applied, saying that over 90 per cent of the oil refineries in



the country primarily dependent on rail shipments are in favor of this plan. Mr. Thorne said the oil industry is unique among the industries appearing in this case, because between one-half and two-thirds of the oil is handled in pipe lines and because of competitive conditions it is essential that a flat increase be made because a percentage would create hardship and a burden which most of the independent companies could not stand. Mr. Thorne put on several witnesses, including A. C. Holmes, traffic manager of the Empire Refineries, who filed exhibits to show that oil is already paying more than its proportionate share of the transportation charges.

Testimony on lumber rates was presented on June 22 and 23 and brought out the same conflict of interest between competing sections as had been shown in the case of other commodities, although there was no objection to an advance in rates and some of the lumber representatives strongly urged an advance. W. J. Stroebel, traffic manager of the North Carolina Pine Association, advocated a straight percentage advance as being the fairest way to give the railroads the increase in revenue which they need and which he hoped would enable them to give better service.

A. L. Osborn, of the Northern Hemlock Manufacturers' Association, said the 100 mills represented by this association are not unanimous; some desire that their natural advantages be preserved by a percentage advance and others are willing to have a percentage advance but with a specific maximum. Personally, he thought that in the long run a percentage basis would be best for the industry, the railroads and the public. "We all want to see the railroads put on a basis where they can be considered prosperous," he said, "so far as it can be done under the law, and we especially would like to see the railroad employees taken care of so they will be efficient and do what they ought to do. We will pay cheerfully whatever the commission finds is necessary to give the railroads funds which will enable them to furnish the service we have been short of." In reply to questions Mr. Osborn said that most of the business of the mills for which he was speaking is short haul business, handled on rates of 12½ to 14 cents.

C. E. Elmquist, representing western lumber producers, asked questions to bring out that Mr. Osborn, as traffic manager of the National Lumber Association, has presided over a recent meeting of representatives of the associations forming the membership of the national organization, at which a resolution recommended by the traffic committee had been adopted expressing the view that if rates on lumber should be raised existing competitive relations should be maintained by a percentage with a specific maximum. R. C. Fulbright, who appeared as counsel for the witness, then brought out that the resolution had been adopted only with the understanding that it would be ineffective unless all of the constituent associations ratified it, and that several had not. He also asked if Mr. Elmquist had not been the author of the resolution. Mr. Osborn said Mr. Elmquist was the "principal author" of it and that Mr. Elmquist represents lumber that is hauled "about as far as any he knew of" but that it was intended as a "harmony resolution," intended to reconcile conflicting views. Chairman Clark remarked that he thought they had "done pretty well to get the lumber people to agree that far."

Mr. Osborn said that a flat increase on lumber would be "the last step of iniquity."

Ray Williams, of the Cairo Association of Commerce, favored a percentage advance and urged that the commission apply whatever increase is proper to the rates, as they stood prior to General Order No. 28 to eliminate the changes in relationship resulting from the percentage and maximum basis then applied. He said he had nothing to say about the measure of the increase.

A. G. T. Moore, traffic manager of the Southern Pine

Association, said the carriers should have a general advance in rates to meet the heavy increases in operating expenses, but he expressed no opinion as to the amount. He also favored the proposed straight percentage increase on the ground that the burden should be borne by shippers in proportion to the cost of operation. Any other method would result in preference to some and prejudice to others, and he didn't believe the commission in this proceeding should inquire into relative adjustments except in the broadest way because the situation demands quick treatment. He did not think the commission has the time to enter upon a detailed consideration of commercial market conditions, because if it were to do so it would be necessary to consider many other factors than the rate, such as the comparative weight of competitive kinds of lumber.

J. H. Snell, a member of the transportation committee of the Southern Pine Association, gave some testimony regarding prices. He said that yellow pine since February 15 has declined from \$45 to \$48 per at the mills to \$30 to \$32. He thought the reason was that lumber went so high in the flurry last winter as to stop the demand.

W. E. Gardner, of the Georgia-Florida Sawmill Association, said the mills he represents have a rather long haul and compete with others better located geographically, but he favored a percentage increase on the ground that an attempt to maintain a parity of relations by a flat advance would not take care of the difference in weights in competitive woods and would give the short haul an abnormally high increase while the long haul would be partially protected.

E. L. Carpenter, of the Northern and Western Pine Manufacturing Associations, said that lumber which is shipped long distances cannot absorb a greater differential over the rates of the short haul competition.

A statement was presented on behalf of the Associated Cooperage Industries, saying they were not opposed to an advance in rates, but favor a flat advance rather than a percentage.

C. E. Elmquist read a resolution adopted by the American Wholesale Lumber Association approving in principle the application of the railroads for an advance in rates, but urging a percentage increase subject to a maximum.

E. E. Williamson, on behalf of the Northern Pine Association, the Western Pine Association, the California White and Sugar Pine Association, and the Southern Hardwood Traffic Association, presented elaborate exhibits showing the freight rates now paid by western lumber, with comparisons showing the effect of a percentage increase as compared with the effect on the short haul traffic. Commissioner Daniels said that Mr. Williamson's plan of a percentage increase without a maximum would assign the same amount of increase to a 600-mile haul as to the haul of over 2,000 miles from the Pacific coast. Mr. Williamson said he thought it was sound economically to make this lumber available in the eastern markets in competition with the local product.

Mr. Williamson was followed by D. C. Conn, who represented the same associations, and who presented exhibits comparing the mill cost of lumber and the freight rates and showing the disadvantage already borne by western lumber in meeting eastern and southern competition in the eastern markets. Mr. Conn also said that various substitutes for lumber, such as cement and steel, move for shorter distances than lumber and would take its place to a large extent if a percentage increase were applied to the long haul shipments of lumber. He also took the position that the net operating income of the railroads should be increased in the future because they will not have to spend so much as they have in the past for maintenance, and he presented exhibits to show that the transcontinental lines need a less percentage of increase than western roads generally.

The lumber testimony was interrupted for a short time on Wednesday while J. C. Chase, president of Chase &

Company, Jacksonville, Fla., growers and distributors of fruits and vegetables, was allowed to testify. He also represented various growers' exchanges and, he said, the great majority of the fruit and vegetable growers of Florida. Mr. Chase made the point that the market price of fruits and vegetables is not influenced by the cost of production and of transportation and, therefore, that an increase in freight rates cannot be passed on to the consumer. He said that fruit-growing is a hazardous business, a large percentage of the growers have operated at a loss, and that there is danger of the rates being so high as to interfere with their movement. Therefore, he thought, a 31 per cent increase would not be justified on this traffic. He also contended that the rates on fruits and vegetables from Florida are now as high as the traffic will bear, are comparatively higher than the rates on other traffic, that the traffic is already highly profitable to the carriers, and that the Florida East Coast and the Atlantic Coast Line, which handle 80 per cent of the perishable traffic of Florida, during the first three months of this year have earned a net operating income which, if continued throughout the year, will give them considerably more than 6 per cent on their property investment.

The commission has received a petition from the Detroit & Cleveland Navigation Company and the Cleveland & Buffalo Transit Company asking for an increase in rail and lake rates by the same percentage as is applied to the all-rail rates.

F. H. Wood on June 21 read into the record a joint telegram signed by J. H. O'Neill, general manager of the Great Northern; E. C. Blanchard, of the Northern Pacific; M. Nicholson, of the Chicago, Milwaukee & St. Paul, and J. P. O'Brien of the Oregon-Washington Railroad & Navigation Company, correcting a few of the erroneous statements made by O. O. Calderhead of the Washington Public Service Commission, while he was on the stand, regarding matters of railroad construction and operation in his state, and particularly his statement that unification of the Seattle terminals by the Railroad Administration had reduced the average detention of cars to 5 days, as compared with 15 days under separate operation, and that under the zone system adopted in March of this year the detention had been increased to 9 days. Mr. Calderhead said he had taken his information from a statement prepared by or under the supervision of Mr. O'Neill. The telegram said Mr. O'Neill had never prepared such a statement and that no complete check had ever been made, but that a careful estimate had shown an average detention of 8.96 days in March, 1920, as compared with 8.71 days in March, 1919, and that no such record as 5 days had ever been made. It was also stated that the shippers have stated that the service at Seattle under the zone system is as good as or better than under federal control.

#### Pullman Company Objects to Surcharge

The Pullman Company on June 22 filed with the commission a statement covering its reasons for opposing the re-establishment of a surcharge for Pullman occupancy, it being its understanding that this method of raising additional revenue for the railroads was under consideration.

As of June 10, 1918, the director general of railroads established an additional charge of  $\frac{1}{2}$  cent per mile to passengers occupying Pullman accommodations, with the result, according to the statement, that Pullman revenue immediately showed a decided falling off against the revenue of the preceding three months when compared with the same period of the preceding year. A statement was attached showing, by weeks, the comparison of gross earnings for the period from March 1 to September 30, 1918, with the corresponding weeks of the previous year, showing that the change took place immediately after the establishment of

the additional charge, and the Pullman Company believes that should this surcharge be re-established, it will have a very serious effect on the volume of its business and the company will not be enabled to correspondingly reduce expenses. The statement continued:

#### Will Decrease Passenger Revenues

"The commission has recently granted the Pullman Company authority to increase its rates as of May 1, 1920, approximately 20 per cent, to offset the very great increase in expenses of all kinds, particularly wages, which has taken place during the past three years, and it is the opinion of the company, should this surcharge be revived, the benefit of this increase will be more than offset by the falling off in gross revenue, without corresponding reduction in expenses. The application of a surcharge of  $\frac{1}{2}$  cent per mile, the amount which was in effect from June 10 to November 30, 1918, would be approximately equal to the Pullman rates in effect prior to May 1, 1920, and would result in increasing those rates, taking into consideration the increases in Pullman fares of approximately 20 per cent, to practically 120 per cent over the rates in effect prior to May 1. It is our firm belief that such an increase would greatly discourage the use of Pullman accommodations, and while it would result in an apparent increase in revenue to the railroads, this increase would be more theoretical than actual, as there can be no doubt but that large numbers of passengers who ordinarily take Pullman accommodations would travel in day coaches, resulting in a loss of revenue to the Pullman Company and to the railroads, through their participation in the Pullman Company's revenue under their contracts. This would be particularly true in our parlor car service, and the traveling public would undoubtedly find the expense of traveling so heavy that it would either entirely forego or greatly reduce the distance it would travel on vacation tourist and pleasure trips.

"To illustrate, the expense of Pullman occupancy from Chicago to points on the Pacific Coast would be so great that such travel would be diverted to closer points, and this would result in a loss to the railroads in long haul service, and would undoubtedly bring out protests from resort cities and hotels, especially those located in Florida and California.

"Exhibit A, attached, shows that for the period from March 5 to June 16, 1917, our gross earnings were \$14,726,300.70 and for the same period in the year 1918, prior to the application of the surcharge, the gross earnings were \$16,979,554.42, an increase of \$2,253,253.72, or 15.30 per cent, while for the period from June 17 to September 29, 1917, gross earnings were \$17,538,376.39 and for the same period in 1918, \$15,695,967.53, a decrease of \$1,842,408.86, or 10.50 per cent. This indicates that the application of a surcharge had the effect of reducing our gross revenue 25.8 per cent, and we have every reason to believe that the re-establishment of this surcharge would have the same effect on our gross revenues.

"It is sincerely hoped that your commission, in taking this matter under advisement, will give consideration to the facts above stated, as well as to those contained in letters addressed to your secretary, Mr. George B. McGinty, under date of April 27, May 7, and May 25, particularly the last two mentioned, in which additional information was furnished as to the number of Pullman cars operated during the first half and second half of the calendar year 1918; the revenues derived from Pullman service during the year 1918, divided between that covered by government and state transportation requests, and that from all other sources; and the number of passengers carried on government and state transportation requests, and all others.

"It is believed that the effect of a surcharge on our business during the period it was in force clearly indicates that



its re-establishment will have a tendency to greatly reduce the Pullman Company's revenue, and indirectly reduce the revenue of the railroads from their passenger service, as well as their share of the earnings of the Pullman Company accruing to them under their contracts with that company." The exhibit referred to was as follows:

that purpose were asked to submit their names with an estimate of the time required.

THE AMERICAN FEDERATION OF LABOR seems not to have been much impressed by Mr. Gompers' argument against Government ownership and operation of railroads. That this policy would

STATEMENT SHOWING BY WEEKS COMPARISON OF GROSS EARNINGS OF THE PERIOD MARCH 1 TO SEPTEMBER 30, 1918, WITH CORRESPONDING WEEKS OF PREVIOUS YEAR

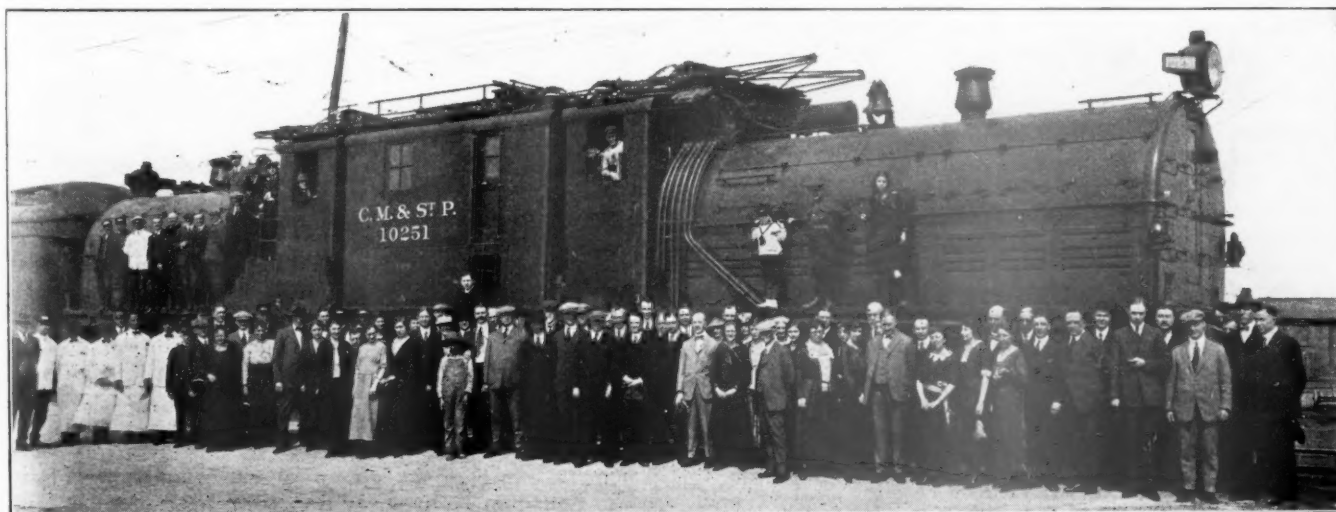
1917			1918			Increase	Decrease
Month	Week	Earnings	Month	Week	Earnings		
March	5-10	\$999,054.83	March	4-9	\$1,122,908.37	\$123,853.54	
	12-17	963,778.95		11-16	1,059,699.48	95,920.53	
	19-24	943,013.82		18-23	1,040,279.00	97,265.18	
	26-31	956,507.56		25-30	1,191,083.88	234,576.32	
April	2-7	1,035,762.07	Apr.	1-6	1,106,850.76	71,088.69	
	9-14	1,047,595.22		8-13	1,131,213.26	83,618.04	
	16-21	993,888.82		15-20	1,088,571.14	94,682.32	
	23-28	933,918.03		22-27	1,089,791.72	155,873.69	
	30-May 5	978,867.00		29-May 4	1,095,410.50	116,543.50	
May	7-12	951,149.90	May	6-11	1,188,287.03	237,137.13	
	14-19	975,082.56		12-17	1,106,722.04	131,639.48	
	21-26	922,605.35		19-24	1,172,054.29	249,448.94	
	28-June 2	913,426.89		26-31	1,107,465.00	194,038.11	
June	4-9	1,051,617.31	June	3-8	1,138,817.77	87,200.46	
	11-16	1,060,032.39		10-15	1,340,400.18	280,367.79	
	18-23	1,089,658.23		17-22	1,033,796.27	\$55,861.96	
	25-30	1,104,976.75		24-29	1,045,020.22	59,956.53	
July	2-7	1,095,234.82	July	1-6	975,377.17	119,857.65	
	9-14	1,052,557.22		8-13	1,031,798.85	20,758.37	
	16-21	1,050,812.39		15-20	949,691.11	101,121.28	
	23-28	1,045,974.45		22-27	957,292.97	88,681.48	
	30-Aug. 4	1,106,398.61		29-Aug. 3	934,615.47	171,783.14	
Aug.	6-11	1,110,295.31		5-10	1,028,375.79	81,919.52	
	13-18	1,170,301.33		12-17	1,022,346.72	147,954.61	
	20-25	1,273,811.58		19-24	1,091,642.32	182,169.26	
	27-Sept. 1	1,281,678.98		26-31	1,047,056.92	234,622.06	
Sept.	3-8	1,350,619.44	Sept.	2-7	1,200,208.12	150,411.32	
	10-15	1,270,798.53		9-14	1,160,600.43	110,198.10	
	17-22	1,291,169.47		16-21	1,105,461.14	175,708.33	
	24-29	1,254,089.28		23-28	1,112,684.03	141,405.25	
		\$32,264,677.09			\$32,675,521.95	\$2,253,253.72	\$1,842,408.86

The railroads had filed a statement at the request of the commission estimating that the application of a 1/2 cent surcharge to the business of 1919 would produce a revenue of \$67,000,000.

Additional testimony is yet to be heard on fruits and vegetables and on iron and steel, to be followed by some rebuttal testimony on behalf of the carriers and oral arguments, with the expectation that the hearing will be brought to a close at the end of next week.

Chairman Clark announced that the commission desires to hear oral argument at the conclusion of the testimony to a reasonable but limited extent, and those desiring time for

at once turn the 2,000,000 railroad employees into Government employees seemed to the great majority of the delegates a point in favor of it. No lack of confidence in their own ability to keep together in politics and control the Government under conditions of widened public ownership is here displayed. But it is to be noticed that the railroad employees did not do much dictating either to Congress or to the Executive when the roads were under Government operation. . . . The delegates voting for public ownership talked and acted as if they represented a majority of those having the elective franchise in the United States; but there is no evidence that they represent a majority even of organized labor.—*New York World*.



Delegates to the National Foreign Trade Convention at San Francisco in May Pose Before One of the New St. Paul Locomotives

These delegates had three special trains, one of which went over the St. Paul. Through the courtesy of that road each delegate was permitted to ride for a while in the locomotive. Another feature of the trip was the securing by telegraph for their benefit the closing stock market prices of some leading 40 stocks at New York. At one station the list was put on the train in the same manner as train orders—by means of the hoop.

## Train Accidents in March<sup>1</sup>

THE FOLLOWING IS A LIST of the most notable train accidents that occurred on the railways of the United States in the month of March, 1920:

### Collisions

Date	Road	Place	Kind of accident	Kind of train	Killed	Injured
3	Central N. J.	Elizabethport	xc	P & P	5	9
8	Southern	Belleville	rc	F & P	1	2
14	Rutland	Riverside	bc	P & F	10	32
18	Missouri Pacific	Texarkana	bc	P & F	2	5
22	Texas & Pacific	Forney	xc	P	0	0
24	C.R.I. & P., Wabash	Des Moines	xc	P & F	0	0

### Deraillments

Date	Road	Place	Cause of derailment	Kind of train	Killed	Injured
5	Atlantic C. L.	Lucama	b rail	P	2	12
8	Pennsylvania	Millport, N. Y.	b rail	P	0	3
17	M. K. & Tex.	Lewis, Mo.	d. eq.	P	2	3
25	Pennsylvania	Longfellow	b rail	P	1	15
26	Southern	Etrick, Ga.	malice	P	2	0
27	Pennsylvania	Dublin, Ind.	b rail	P	0	3
28	C. C. & St. L.	Crawfordsville	b rail	F	0	0
30	Buffalo, R. & P.	Savan, Pa.	b rail	P	0	24

The trains in collision at Elizabethport, N. J., on the 3rd were westbound passenger No. 123, which was running at about 40 miles an hour, and a local passenger train being moved across the main track. The switching passenger train was moving backward, and the two engines bore the brunt of the collision. Both engineers and two other persons were killed, and eleven passengers were injured. Train 123 had passed distant and home block signals set against it. The engineer was seen to be standing, apparently attentive, after he passed the distant signal.

The Interstate Commerce Commission investigated this collision and made a report on April 8. The signals were found in good condition. The evidence seemed to indicate that the engineer of train 123 must have suffered some lapse of his faculties, but the nature of this lapse could not be determined. He had been an engineer for about six years, with a good record. The local passenger train was southbound and had crossed the main line for the purpose of reaching the passenger station; and it was setting backward in order to proceed through a Y track to the main line and to continue its run to Dunellen, N. J. The report observes that if there were a platform for passengers adjacent to the Y track north of the main line this crossing movement would not be necessary and the safety of operation would be materially increased.

The trains in collision at Belleville, Ill., on the 8th, were an eastbound freight and an eastbound passenger, the freight (consisting of an engine and a caboose) running into the rear of the passenger while it was standing at the station. A news agent was killed, and a train master and a mail clerk were injured. The freight had left the last preceding station only five minutes behind the passenger, instead of ten minutes as required by rule; and the men in charge of the freight overlooked the schedule of the passenger train.

The trains in collision at Riverside, Vt., on the 14th, were a northbound passenger and a southbound freight; both engines, ten freight cars and the first three cars in the passenger train were wrecked. Five passengers and five trainmen were killed, and twenty-five passengers and seven trainmen were injured. The collision was due to misreading of a train order by the men in charge of the freight train; "Bartonsville," poorly written, was taken to be "Bellows Falls." This collision was reported in the *Railway Age* June 4, page 1572.

The trains in collision near Texarkana, Tex., on the 18th were a southbound passenger train and a northbound equip-

ment train. Both engines and two cars were badly damaged. The trains were moving at about 15 or 20 miles an hour when they came together; and two trainmen were killed, and five injured. The collision was due to improper flagging on the part of the yard crew and excessive speed on the part of the passenger train.

The train involved in the collision at Forney, Tex., on the 22nd, was southbound passenger No. 3. Running over a misplaced switch at about 40 miles an hour, it crashed into a string of freight cars standing on a side track. The locomotive was badly damaged and three cars were ditched. No serious injuries were reported.

The trains in collision at Des Moines, Iowa, on the evening of the 24th were a local passenger train of the Rock Island, No. 478, and a freight train of the Wabash. The passenger train struck the freight at the crossing of the two roads at East Fourteenth street, and the engine and one car of the passenger train were ditched. No person was seriously injured. There are no signals at the crossing.

The train derailed near Lucama, N. C., on the 5th, was northbound passenger No. 86. The engine and first two cars were damaged and the engineer and fireman were killed. Twelve passengers were slightly injured. The road was blocked eighteen hours. The derailment was due to broken rail.

The train derailed at Millport, N. Y., on the 8th, was a northbound passenger.

The train derailed at Lewis, Mo., on the 17th, was southbound passenger No. 5. Running at about 60 miles an hour over a curve of 2 deg., the two locomotives were derailed and overturned, and the first three cars were damaged. Two trainmen were killed and three were injured. The cause of the derailment was the failure of a brake-hanger post on the second engine, which dropped on the track.

The train derailed near Longfellow, Pa., on the morning of the 25th was eastbound passenger No. 20, the Keystone Express. Running at about 60 miles an hour the last five cars in the train were thrown off the track by a broken rail. This train was on track No. 2; and one of the cars fell against a freight train moving westward on track No. 1 and ten loaded cars in that train were derailed. Ten passengers were injured, one of them fatally; and four employees were injured. The broken rail, open-hearth steel, 130 lb., was found to be piped  $\frac{1}{8}$  inch under the center of the head.

The train derailed at Etrick, Ga., 18 miles south of Macon, on the 26th, about 2:30 a. m. was a northbound express, the Royal Palm Limited. The train was derailed at a maliciously misplaced switch and the locomotive was overturned. The engineer and fireman were killed. The switch lock had been broken and the switch set for the side track.

The train derailed near Dublin, Ind., on the 27th was eastbound passenger No. 114. While running at about 50 miles an hour, two coaches were derailed by a broken rail and overturned; and two passengers and one mail clerk were slightly injured.

The train derailed near Crawfordsville, Ind., on the 28th was an eastbound freight. A car in the train near the rear end, was derailed near the bridge over Sugar Creek and, with five other cars and the caboose, fell to the stream below.

The train derailed at Savan, Pa., on the 30th was a southbound passenger, No. 111. Running at about 30 miles an hour the first four cars were thrown off the track by a broken rail. Four trainmen and 20 passengers were slightly injured.

**Canada.**—In the derailment of an eastbound express train on the Canadian National at Belleville, N. S., on the 22nd of March, two passenger cars were overturned and fell down a bank, and 13 passengers were injured.

**Electric Car Accidents.**—In a rear collision of street cars at McKeesport, Pa., on the 10th of March, one passenger was killed and three were injured.

<sup>1</sup>Abbreviations and marks used in Accident List:  
rc, Rear collision—bc, Butting collision—xc, Other collisions—bb, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc, obst, Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass., Passenger train—F, or Ft, Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.



# Operations of Supply Trains on Southern Pacific

## Company Materials Are Handled More Efficiently and More Economically by Special Service

BY THE PROPER OPERATION of store trains on the Southern Pacific, approximately \$11,586 has been saved monthly in the delivery of company material, according to A. S. McKelligon, general storekeeper, who recently addressed the Pacific Railway Club, San Francisco, Cal., on this subject. The actual results which have been accomplished on this road were described in a letter, part of which was quoted in the *Railway Age* of January 2 (page 86), from Mr. McKelligon to J. D. Stuart, supervisor of stores of the United States Railroad Administration. After giving in brief the savings made in the cost of delivering and collecting company material by regularly established supply trains and describing the operation of these trains, Mr. McKelligon presented several statements which show in detail the service performed by supply trains, their cost, and an estimate of the cost if the material handled by these trains had been handled as local freight. These statements follow:

### STATEMENT SHOWING SERVICE PERFORMED BY SUPPLY CARS MONTHLY

Number of supply trains in service operating.....	4
Number of miles covered by main line and branch.....	5,175
Value of material delivered.....	\$140,000

Approximate amount in tons of coal, l. c. l. lumber, distillate, oils, track material, hand push and velocipede cars, and all other miscellaneous material and supplies delivered by supply train.....	5,900
Approximate amount in tons of second-hand and scrap material picked up by supply trains.....	3,000
Approximate number of requisitions handled.....	7,200

### STATEMENT SHOWING COST OF OPERATING SUPPLY TRAINS MONTHLY

Labor at stores in loading supply cars.....	\$ 500
Wages of supply car storekeepers and helpers.....	1,085
Personal expenses of supply car storekeepers and helpers and store department proportion of expenses incident to performance of cook and living cars operated in connection with supply trains.....	550
Charges from transportation department for wages of train and engine crews, roundhouse expense and other incidental expenses, also fuel.....	4,700
Track laborers accompanying supply train.....	600

\$7,435

### STATEMENT SHOWING ESTIMATED COST OF HANDLING BY LOCAL FREIGHT MATERIAL NOT DELIVERED BY SUPPLY TRAIN MONTHLY

Estimated cost of overtime to local trains and engine crews, if material was handled by local freight.....	\$ 3,280
Estimated cost at local freight houses of handling, transferring and billing (on basis of 50 per cent of material passing through freight houses) at 57 cents per ton..	1,681
Estimated loss account material damaged or lost in transit, etc. (using as a basis 3 per cent of material delivered) .....	420
Estimated cost of picking up scrap and cost of handling, sorting, etc., at division stores, before shipping to general scrap headquarters, also overtime to local freight train and engine crews.....	2,500
Approximate cost of packing, tagging, loading, waybilling, etc., at shipping stores.....	5,040
Stock on hand would have to be increased at all division stores approximately \$160,000, if each had to provide for their division requirements. (Interest on investment at rate of 6 per cent per annum).....	800
Estimated value of additional track tools, hand, push and velocipede cars, which would be required on line if no regular exchange system was in effect, \$64,000. (Interest on investment at rate of 6 per cent per annum) .....	320
Estimated cost of motor car maintenance and operator for use of watch inspector on monthly trip of watch inspection .....	255

Estimated cost of doing work by work train, such as distribution of ties, gravel, ice, sprinkling right of way with fuel oil, etc., which is now handled by supply train	1,125
Estimated cost of labor necessary to deliver material from freight house to section and signal tool houses, B. & B. and extra gangs on line, etc.....	3,600
	<hr/> \$19,021

### Description of the Service

The number of trains in this service on the Southern Pacific total four and they are operated from the Los Angeles, Cal., and Sacramento general stores. They cover a territory of approximately 5,175 miles and operate on a regular schedule every 30 days on the main line and every 60 days on the less important branches.

The supply train itself consists of from 17 to 25 cars, the number of cars depending upon the territory served. Five of these cars are specially fitted for this service. Car No. 1 is equipped with a desk and bunks for the supply car storekeeper and his helper, and also with racks and bins for station supplies and light hardware, etc. Car No. 2, the oil car, is supplied with 500 and 1,000 gal. oil tanks with Bowser pumps. Car No. 3 is fitted with racks for carrying all track tools, handles, brooms and other bulky supplies. Cars No. 4 and 5 are equipped for the transporting of miscellaneous materials. The balance of the train consists of carloads of other supplies for delivery and of flat cars for the transporting of scrap, second-hand and surplus materials picked up on the line.

### Materials Handled

The classes of materials handled by the supply train include all of the supplies used in maintenance of way work, including frogs, switch points, switch stands, joints, bolts, spikes, etc. In addition, l.c.l. lots of lumber, push, hand and velocipede cars, warehouse and baggage trucks, mail carts, crossing and right-of-way signs, drums of distillate for pumping plants, and of gasoline for section and signal maintainers' headquarters, lime and soda ash for water treating plants, coal, ice, oils to be used in the signal, maintenance of way and bridge and building departments, pumping plants and station agencies, and miscellaneous material are carried on this train. The value of the material handled monthly is approximately \$140,000. In addition, approximately 3,000 tons of second-hand and scrap materials are picked up monthly by the supply train. In a large majority of cases division superintendents, division engineers, signal or assistant signal supervisors, roadmasters and division storekeepers use this train as a means of making regular inspections of their respective territories.

### Method of Handling Requisitions

Requisitions, totaling approximately 7,200 monthly, are usually made up by the roadmaster and sent direct to the division storekeeper, who inspects them and forwards them to the general store from which the supply train operates. It is not considered necessary to have the superintendent and division engineer's approval on these requisitions, inasmuch as both of the latter usually accompany the supply train and the materials furnished may be investigated on the ground.

On account of the supply trains being on the road practically the entire month, a supply train clerk has been established at the two general stores from which the trains operate

and when requisitions are received at these points they are registered and turned over to his clerk, who prepares a summary of all material called for on the requisitions, and arranges for its assembly so that when supply trains arrive for loading there is little delay. This clerk also attends to the expediting of material to and from the shops, requests the general office for emergency purchases and ships needed material to meet the supply trains at various points. In addition to these precautions to meet emergency conditions the supply trains carry surplus material in order to be able to take care of such emergency requirements as have become necessary after the making of requisitions.

Previous to starting each day's work, the supply car storekeeper prepares an unloading list by stations for the day. This list is made in triplicate, the supply car storekeeper retaining the original, one copy going to the helper and the other to the division storekeeper. Between stations the division storekeeper checks his copy of the unloading list and determines the number and class of tools, etc., to be exchanged, as well as the material which has been ordered. Upon arrival at the tool house he immediately checks the amount of stock on hand, in most cases with the roadmaster and quite frequently with the division superintendent and division engineer. It is then determined whether or not the quantity ordered is over or above what is actually needed for a 30-day period or if the amount ordered should be increased. In either case the material decided upon is delivered and the requisition is changed accordingly.

#### Exchange of Materials

The exchange of tools and other exchangeable material is watched very closely in this manner. The fact that everything that can be exchanged is exchanged, without doubt saves considerable money to the railroad, as it eliminates abuses, losses through theft and other practices which have been costly in the past.

Three other functions are performed by the supply train, one of which is the distribution of illuminating and lubricating oils, which are apportioned according to a prepared schedule showing the amount of these oils that will be required at the various points by various departments monthly. In addition, all of the maintenance of way scrap accumulation is collected by the supply train from the section headquarters. The signal, bridge and building departments, pumping plant, station agencies and others gather scrap, obsolete, surplus and second-hand material in a similar manner, and this material is in turn picked up by the supply train. The last function of the supply train is to pick up tools for repairs and bring them to the two general stores where all tools for the system are repaired.

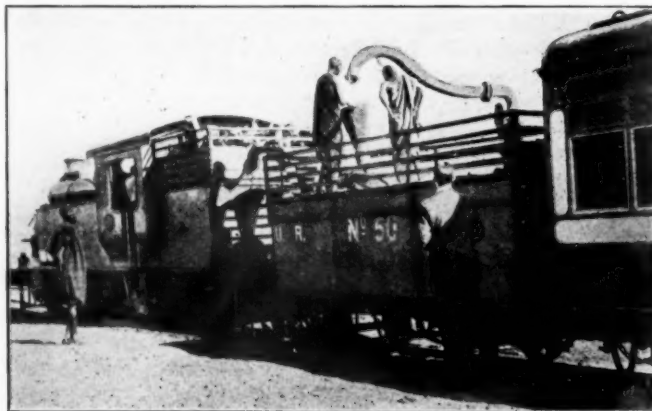


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A Scene in British East Africa

## Fuel Stations\*

AT THE 1915 convention several devices were reported for measuring the coal as delivered to locomotives, but at that time none of the suggested equipments had been extensively used. Since that date, however, there has been a considerable number of at least two of the suggested types of equipments installed and maintained regularly in service.

One of the earliest installations is that of the Nashville, Chattanooga & St. Louis at Cowan, Tennessee. These machines have been operating since 1916 with an average issue

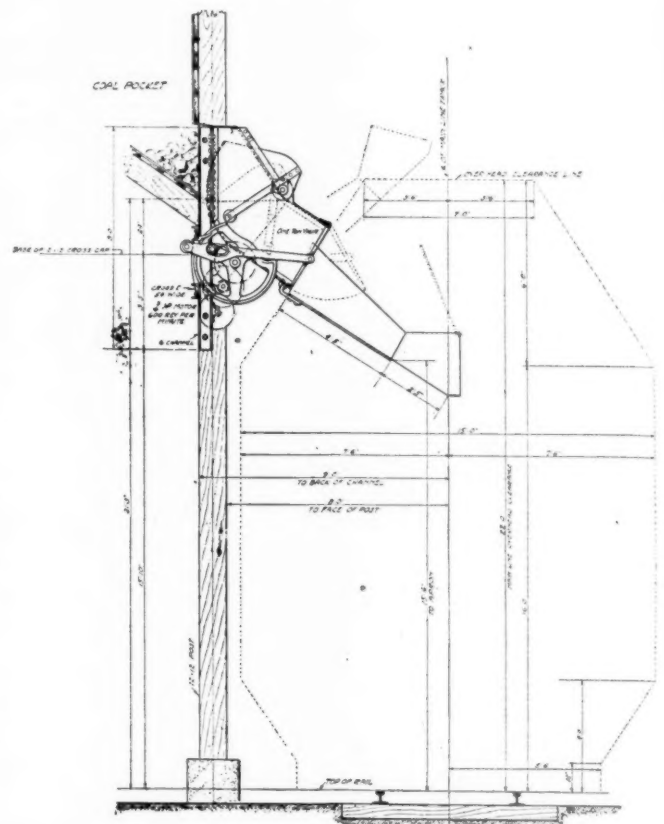


Fig. 1. Coal Measuring Device, N. C. & St. L.

of 200 tons of coal per day and have handled up to a recent date approximately 192,000 tons. This railroad also has six additional equipments of the same type at three other points. At one of these stations the record for the past twenty months, with no break-down, indicates 150,000 tons of coal issued, one device recording 88,234 tons.

Fig. 1 outlines the general arrangement of this type of measuring device and illustrates its application to an existing chute. This machine is operated with a two-horsepower electric motor in one continuous rotary movement in one direction. It is so designed that as the delivery gate is opened, the undercut gate arm rolls on the surface of the large cam, in that way locking it. When the undercut gate is down, ready to receive the issue of coal from the bin, the delivery gate is also locked, and these movements alternate so that it is impossible to have both gates open at the same time and thus release a bin full of coal. The ordinary operation is five cycles per minute. As first constructed, the cut gears used were made of cast iron. These broke in several instances so that all steel gears are now used with the equipment.

There is one feature in connection with the use of such power driven machinery as this which should be mentioned, and that is, that it is a practical necessity to have the coal

\*Abstract of a report presented at the convention of the International Railway Fuel Association.



issued by the assigned operator at the coaling station. Such a mechanism should not be handled promiscuously by many different men, most of whom would know nothing beforehand of its construction or method of operation. This equipment, the same as other parts of mechanically operated coal chutes, requires regular and systematic attention and maintenance.

As illustrating the second type of measuring device, the Chicago, Milwaukee & St. Paul in 1918, installed the equipment shown in Fig. 2 on a 75-ton coal chute at Jack-

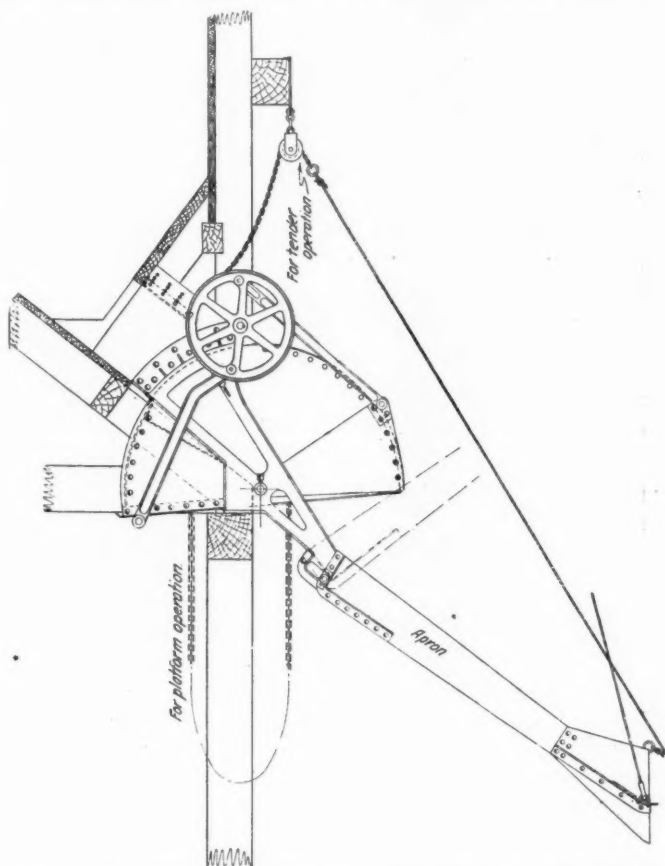


Fig. 2. Coal Measuring Device, Jackson, Minn., C. M. & St. P.

son, Minn. With this equipment the operator, after lowering the chute into position, discharges the coal from the measure by pulling on the operating rope. The locked-in position of the unbalanced measure is thus released and the entrained coal is discharged, the inlet gate being automatically closed. When the measured coal is all discharged, a second pull on the operating rope tilts the measure back again to the filling position, closes the outlet gate and opens the inlet gate. As the measure is again filled the operations are repeated. The reported time for taking five measures or five tons of coal is three minutes, that is, from the instant that the engine stopped in front of the chute until it started away. There are 14 engines taking coal at this point, averaging 5.8 tons per engine. A recent report on this particular installation advises that, "There is no question in our minds, however, but that this device gives much closer approximation to correct weights than the old method of estimating weights. The device appears to be satisfactory to all concerned and it costs much less to install than scales."

Discussions and reports presented at the convention from year to year have called attention to the necessity of delivering the coal into the storage bin in such a manner that the fine and coarse coal will not segregate, with the resulting effect that one locomotive tender will receive all coarse lump coal and the next one get only the fine and in some cases

almost powdered coal. The coal should be delivered into the storage bin directly over the opening for the discharge of the coal to the locomotive tender. In other words, the coal should fall on the pile in the bin at a point directly

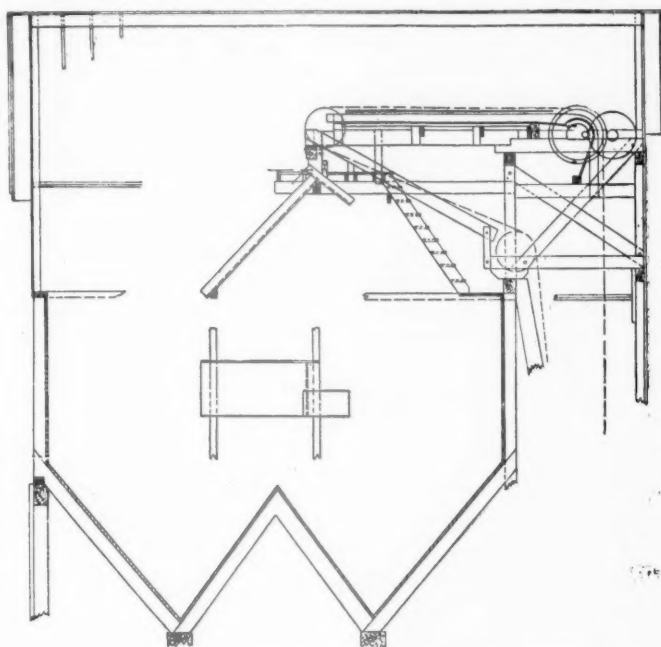


Fig. 3. Improper Discharge of Coal to Storage Bins

over the discharge opening. The natural separation of the coarse coal toward the lower edge of the pile will not then materially affect a fairly uniform mixture of the coarse and fine coal at the point of discharge. As illustrating corrections necessary to overcome the difficulty of locomotives on one track receiving all fine coal and the locomotives on the

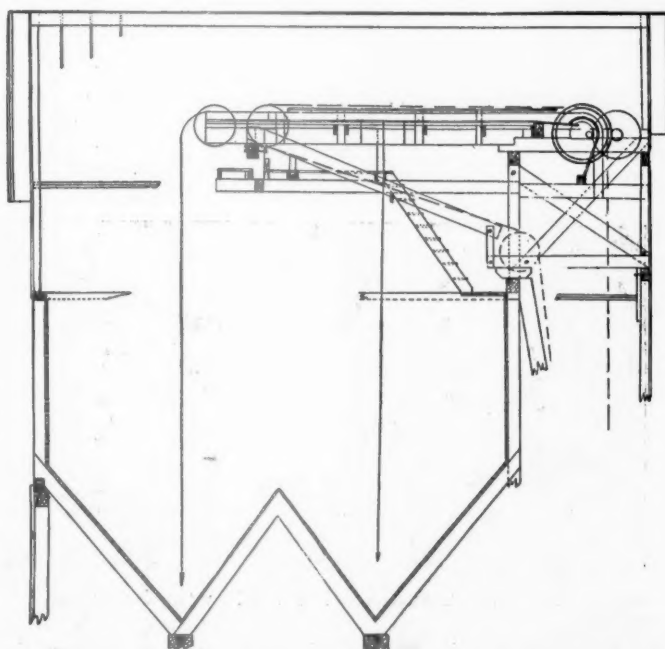


Fig. 4. Correction in Discharge of Coal to Storage Bin

second track receiving all coarse coal from the discharge openings of one bin, Figs. 3 and 4 are shown. Fig. 3 illustrates the arrangement which caused the trouble. The bucket conveyor delivered the coal over the idler at the center of the bin. The coal then dropped to the upper ends of

the two inclines shown, but in passing over the edge of the conveyor, practically all the lumps threw over onto the long incline and only fine coal dropped onto the short incline. Further, the momentum of the coal on the long incline was such that the coarse coal was all delivered on the pile against the left hand wall of the bin and as the bin was filled full only fine coal worked over the center ridge to the right hand discharge opening. By eliminating the inclines and providing a discharge opening in the conveyor directly over the center of the right half of the bin, coal is being delivered to each of the two tracks well and uniformly mixed.

Another railway reports satisfactory improvement in the mixing of the coarse and fine coal by the use of a baffle at the lower end of the distributing chutes. The purpose is to deflect the lumps downward so that they will fall vertically with the slack instead of falling over to one side of the pocket and there forming a mass of lump coal. However, this does not, as arranged, apparently entirely eliminate the separation trouble.

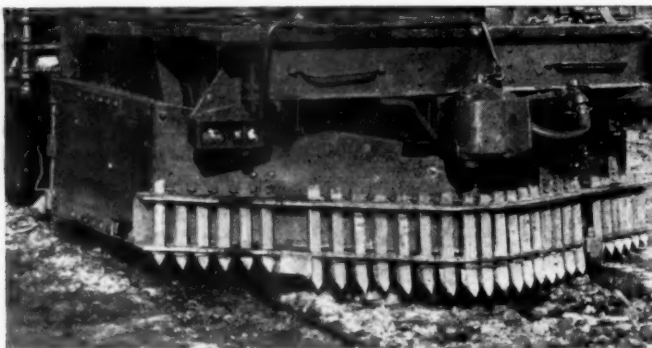
In the design of any fuel oil station advantage is usually taken as far as possible of gravity flow of the oil. In many cases, however, there is no opportunity for utilizing that flow, due to local topography and conditions surrounding the point where it is desired to locate the station. As a result many and various arrangements of facilities have been resorted to. The following illustrations, however, it is believed will indicate the general practice in handling this kind of fuel in storage and delivery plants.

[The report included a number of illustrations of typical fuel oil stations, which were presented without critical comment.—EDITOR.]

The report was signed by W. E. Dunham (Chairman), C. & N. W.; E. E. Barrett, J. C. Flanagan, J. W. Hardy, W. T. Krausch, R. A. Ogle, J. L. Rippey, C. F. Ludington, C. M. & St. P., and J. E. Nellegar.

## Using a Ballast Spreader to Remove Ice from Tracks

ICE BETWEEN THE RAILS, which has ordinarily been removed only by the laborious and expensive use of hand picks, has been cut out successfully during the past two winters with an attachment designed to fit on the plow front of a Jordan spreader, where it is held by special bolts with-

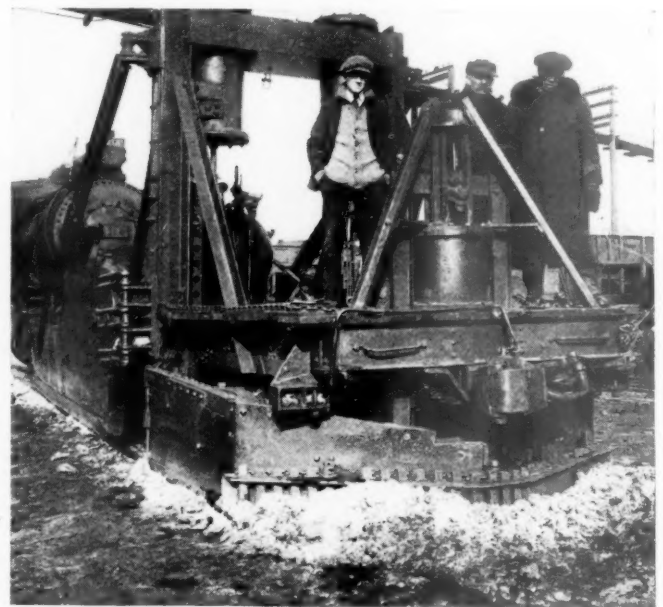


How the Teeth Are Mounted in the Frame

out necessitating the removal of any parts from the spreader. A steel frame composed of a channel holds a series of 29 interchangeable chisels or steel teeth, arranged so that there are six on the outside of each rail and 17 between the two. Each chisel is held independently in the frame in such a way that it can be adjusted quickly to regulate the depth of cut below the top of rail, or it can be removed entirely for re-dressing. In this way the chisel teeth can be used for a long

time, their term of life being limited only by their over-all length and the amount of metal removed on regrinding. Flanged shoes are fastened under the frame and the spreader plow front, which ride the rails in a manner similar to that of a snowplow and, besides doing considerable work in clearing the rail, act as a lining device to keep the attachment well centered between the rails.

In actual operation one man controls the spreader, rais-



Jordan Spreader With Ice Cutter Attached

ing and lowering the attachment by means of the air lift on the front plow in order to clear obstructions or to work in and around switches, etc. The results obtained have proved satisfactory in ice, frozen cinders, and similar materials encountered in winter operation at terminals and freight yards, which materials were easily broken out, leaving the rails clean and with a good flange-way.

This arrangement was devised by the Canadian Pacific and tried out during the fall of 1918 and spring of 1919 and proved so successful that over 20 of these attachments were in service on its Eastern lines during the past winter.



Aerial View of New Union Station at Washington, D. C.



## General News Department

The Canadian National denies the reports which have appeared recently in various newspapers to the effect that business men of Western Canada have launched a movement for the flotation of a \$5,000,000 bond issue to aid the completion of the Hudson Bay Railway.

Violation of the Lever Act, by participating in the switchmen's strike in April, charged against 31 railroad employees in the United States District Court at Los Angeles, Cal., resulted on June 19 in a verdict of guilty against five men; not guilty in the cases of 14, and disagreements in 12 cases.

H. R. Safford, assistant to the president of the Chicago, Burlington & Quincy and formerly chief engineer of the Grand Trunk, has received from Purdue University the honorary degree of Doctor of Engineering. Dr. Safford is this year president of the American Railway Engineering Association.

Airplanes in the service of the Post Office Department traveled during the month of May nearly 50,000 miles and only two forced landings were made because of mechanical trouble. Deliveries were made on time on more than 80 per cent of the trip except between Cleveland and Chicago, where the percentage was sixty-five.

A call has been issued for a convention of railroad employees at Chicago on June 29 to perfect the organization of "one big union," according to information received by the Department of Justice at Washington. The origin of the call has not yet been determined, but the department proposes to watch for such a meeting. The call was published in the Butte (Mont.) Daily Bulletin signed by "The Committee."

The American Train Despatchers' Association closed its annual meeting in New York City on Saturday, June 19. J. G. Luhrs, of Spokane, Wash., was re-elected president, and C. L. Darling, Spokane, secretary and treasurer. The meeting decided that hereafter there shall be three vice-presidents, who are to devote their entire time to the work of

Sperry, of New York, representative of the four principal signal companies, on Train Operation by Signal Indication.

"The Big Four Daily" is a four-page sheet which the Publicity Department of the Cleveland, Cincinnati, Chicago & St. Louis is printing each day in a car of the first section of the special train which was made up by that road and which is carrying Ohio democrats—fifteen carloads of them—to San Francisco, with the irresistible purpose of nominating the governor of their State, James M. Cox, for President of the United States. The price of this paper is \$5 a copy, but it is "given away to friends of the New York Central Lines." It starts out with a Democratic tone and the first page bears a portrait of Governor Cox; but further along the editor declares that in politics he is neutral; and the thing on his mind for the most of the time is to advertise the New York Central Lines. One page is taken up with the names of the occupants of the 15 sleeping cars. Copies of the paper will be "mailed when printed," the publication being "entered at the nearest post office as first-class mail matter."

### Earnings for April—Large Deficit

During the first four months of this year the railroads of the United States have earned a net operating income of only about \$5,000,000, although the government has been guaranteeing them approximately \$75,000,000 a month. This appears from a partial summary for April and four months issued by the Interstate Commerce Commission, in which, however, four large roads and 21 smaller ones are missing. The net operating income for four months is shown as \$55,059,637, as compared with \$51,575,726, for the first four months of 1919; but this includes about \$50,000,000 back mail pay taken into the January accounts. For April the roads reporting show a deficit of \$15,625,529, as compared with a net for April, 1919, of \$20,703,196. The complete reports for March and April have been delayed by the accounting complications resulting from the termination of federal control. The partial summary as issued by the commission is given in the double column table:

OPERATING REVENUES, EXPENSES AND INCOME; MONTH OF APRIL AND FOUR MONTHS JANUARY 1—APRIL 30										
	Freight	Passenger	Railway operating revenues	Maintenance of way and structures	Maintenance of equipment	Railway operating expenses	Net railway operating income	War taxes	Miles of road operated	
<i>Eastern District:</i>										
April, 1920 .....	\$83,953,655	\$28,010,597	\$127,080,772	\$20,358,888	\$39,127,770	\$133,157,076	(D)\$14,729,880	\$659,082	\$48,930.35	
April, 1919 .....	85,314,244	27,753,848	126,544,195	17,993,777	32,094,442	115,359,535	4,825,292		48,829.35	
Four months 1920 .....	383,194,558	105,072,935	566,450,062	72,365,471	161,707,799	556,329,360	(D)18,471,876	1,125,688	48,811.73	
Four months 1919 .....	336,347,950	101,948,673	489,357,697	69,169,344	129,379,999	462,501,384	2,436,914		48,835.72	
<i>Southern District:</i>										
April, 1920 .....	49,545,537	14,896,400	70,035,994	11,401,800	18,341,783	64,619,155	2,388,913	457,742	43,762.81	
April, 1919 .....	44,301,482	15,368,521	64,168,922	10,756,575	16,095,283	56,506,686	5,281,911		43,299.75	
Four months 1920 .....	213,381,850	58,154,951	303,566,328	44,858,783	73,680,201	261,695,149	30,680,201	720,652	43,653.85	
Four months 1919 .....	173,162,782	62,593,150	252,480,284	41,608,269	63,370,254	223,688,097	18,328,727		43,288.87	
<i>Western District:</i>										
April, 1920 .....	89,700,717	30,273,317	131,768,979	27,241,935	32,014,685	124,562,554	(D) 3,284,562	969,324	109,901.75	
April, 1919 .....	85,238,753	27,651,320	122,138,226	22,829,174	27,094,470	104,710,569	10,595,993		109,622.96	
Four months 1920 .....	395,377,124	120,371,053	584,159,531	92,683,626	132,141,160	502,842,902	42,851,312	1,940,332	109,856.57	
Four months 1919 .....	334,356,352	108,037,234	475,293,306	80,202,028	111,603,160	418,587,612	30,810,085		109,618.26	
<i>United States:</i>										
April, 1920 .....	223,199,309	73,180,314	328,885,745	59,002,623	89,484,238	322,338,785	(D) 15,625,529	2,086,148	202,594.91	
April, 1919 .....	214,854,479	70,773,689	312,851,343	51,579,526	75,284,195	276,576,790	20,703,196		201,752.06	
Four months 1920 .....	991,953,532	283,598,939	1,454,175,921	209,907,880	367,529,160	1,320,867,411	55,059,637	3,786,672	202,322.15	
Four months 1919 .....	843,867,084	272,579,057	1,217,131,287	190,979,641	304,353,413	1,104,777,093	51,575,726		201,742.85	

NOTE—Federal law-over items settled during the month are included in the above compilation for those roads that have indicated that estimates were not included for substantially all unaudited corporate items.

The figures for four months include the back mail pay, which was included in the accounts for the month of January to the extent of approximately \$50,000,000.

The war taxes of the corporations are included in the figures for March and April, 1920, only.

In making comparisons with the federal figures for 1919, it should be noted that in addition to war taxes, the corporate figures for 1920 include some items classified principally under general expenses, that did not enter into the accounting for the expenses of federal control.

It should also be noted that hire of equipment charges and credits are now made between roads, which was not done for the corresponding months of 1919. This may affect the comparison of net railway operating income as between districts, but not for the country as a whole.

the association; and those elected to these places were W. J. Potts, Little Rock, Ark.; O. H. Braese, of New York City, and A. M. Gorman, of Portland, Ore. On Thursday, the 17th, the association listened to an address by Henry M.

This summary omits reports of the Pennsylvania, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago, Burlington & Quincy, and the Southern Pacific, as well as 21 smaller roads which have not filed their reports.

## REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of way and structures.		Operating expenses			Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) in income, with last year.	
		Freight.	Passenger.	Total (Inc. misc.)	Equip. structures.	Way and structures.	Traffic.	Transportation.	General.					Total.
Vicksburg, Shreveport & Pacific.....	171	\$207,632	\$91,405	\$323,974	\$40,181	\$60,076	\$4,857	\$123,671	\$10,981	\$243,138	\$80,836	\$13,717	\$67,117	\$30,132
Virginian.....	523	1,151,640	58,303	1,330,778	125,765	262,912	6,828	499,998	27,807	926,182	404,595	42,661	379,714	379,714
Wabash.....	2,472	3,301,755	747,368	4,373,493	654,320	968,115	76,239	2,266,580	146,165	4,169,273	234,321	130,734	72,838	134,427
Western Maryland.....	797	1,268,014	78,991	1,445,505	227,799	459,408	18,912	535,049	44,565	1,299,516	141,056	50,000	91,056	229,157
Western Pacific.....	1,011	762,643	141,136	949,719	171,686	180,926	29,317	352,934	36,684	791,695	158,025	57,486	100,518	200,607
Wheeling & Lake Erie.....	511	902,585	61,085	1,039,054	140,682	312,423	7,824	501,280	32,337	998,380	40,674	66,900	26,236	87,259
Wichita Falls & N. W.....	256	175,306	34,198	222,846	43,309	23,155	194	78,354	35,003	180,015	42,831	11,178	31,653	51,188
Wichita Valley.....	256	112,314	33,715	152,759	30,904	17,593	57	57,940	7,711	97,125	45,634	1,707	49,927	58,337
Alabama & Vicksburg.....	141	484,162	200,419	684,581	113,816	159,606	15,281	300,025	28,977	626,910	80,54	38,953	12,376	99,386
Alabama Great Southern.....	312	1,846,436	501,023	2,706,650	315,918	655,438	53,332	946,670	60,434	2,047,558	151,391	83,101	112,376	258,780
Atchison, Topeka & Santa Fe.....	8,682	34,650,246	12,079,808	46,730,054	6,418,362	11,278,170	474,193	17,079,889	799,184	36,042,544	67,94	17,001,271	2,700,248	14,297,134
Atlanta, Birmingham & Atlantic.....	639	1,034,965	206,130	1,241,095	270,516	396,614	50,036	695,864	42,538	1,455,762	102,66	48,479	86,650	207,751
Atlantic City.....	177	326,607	368,568	695,175	134,791	103,852	3,317	526,355	3,537	772,132	102,26	40,623	57,724	63,505
Atlantic & St. Lawrence.....	166	642,511	82,594	725,105	192,709	186,206	8,896	514,384	44,477	949,833	123,69	36,902	218,842	15,494
Baltimore & Ohio Chicago Terminal.....	90	.....	.....	646,864	70,831	156,632	3,507	471,796	33,487	748,628	115,73	83,754	185,518	201,865
Atlantic Coast Line.....	4,891	12,293,817	5,049,963	19,343,780	2,292,892	3,630,480	223,097	8,119,240	364,633	14,786,838	76,46	665,000	2,882,360	1,380,668
Baltimore, Chesapeake & Atlantic.....	87	172,675	55,475	228,150	23,869	121,560	3,016	189,106	11,242	348,793	135,34	11,100	102,187	85,251
Bangor & Aroostook.....	658	1,076,917	228,140	1,305,057	361,721	400,179	11,601	647,324	42,308	1,482,460	102,13	30,867	76,199	163,172
Beaumont, Sour Lake & Western.....	118	362,785	87,433	450,218	112,696	61,135	5,434	153,512	14,391	347,068	72,91	9,530	121,366	122,215
Belt Ry. Co. of Chicago.....	31	.....	.....	1,167,876	87,434	229,026	1,220	742,096	27,712	1,082,490	92,68	85,386	7,302	137,622
Bessemer & L. E.....	217	1,671,062	108,327	1,779,389	180,216	964,106	32,079	844,829	77,034	2,116,433	112,63	43,600	280,992	119,221
Birmingham & Gulf.....	36	428,429	5,436	433,865	88,197	107,425	5,239	104,668	10,052	321,429	73,00	118,871	22,275	96,594
Birmingham Southern.....	31	86,372	121,651	208,023	19,729	78,373	3,259	78,373	10,288	123,839	101,79	5,263	7,450	51,485
Boston & Maine.....	2,304	10,245,198	4,939,758	15,184,956	3,118,411	4,443,232	124,848	11,203,450	588,326	19,552,437	111,95	2,087,713	2,779,285	2,040,620
Buffalo, Rochester & Pitts.....	589	3,346,951	382,141	3,729,092	539,869	1,498,128	42,197	2,027,463	98,584	4,213,254	102,71	85,000	2,197,161	6,343
Canadian Pacific Lines in Maine.....	233	671,682	267,278	938,960	128,949	230,951	8,692	659,387	10,612	1,038,692	113,47	36,600	159,939	77,630
Central New England.....	301	1,132,410	71,375	1,203,785	390,083	478,105	8,224	931,202	46,991	1,554,877	144,29	52,495	623,852	498,344
Central of Georgia.....	1,924	3,962,080	1,534,265	5,496,345	1,019,132	2,335,540	122,519	2,658,908	196,636	5,242,151	123,163	222,495	1,000,411	908,190
Central Vermont.....	413	998,399	249,063	1,247,462	222,625	477,552	33,640	1,059,372	55,042	1,611,280	128,67	52,200	467,061	210,516
Charleston & W. Carolina.....	342	644,431	152,373	796,804	172,781	198,951	11,982	432,127	5,746	821,587	97,51	21,002	4,498	64,073
Chesapeake & Ohio.....	2,516	15,021,820	2,189,381	17,211,201	18,856,924	2,463,159	5,009,457	7,722,457	388,297	15,863,592	84,12	2,993,332	3,883,067	697,392
Chicago & Alton.....	1,051	4,838,955	1,390,250	6,229,205	742,147	1,889,694	145,025	2,772,457	388,297	5,863,592	91,60	609,430	2,383,067	697,392
Chicago & Erie.....	1,131	4,888,881	1,204,574	6,093,455	736,146	1,869,694	173,934	3,262,447	173,934	6,176,499	91,60	201,793	408,393	160,141
Chicago & Erie.....	1,269	5,759,925	1,204,574	6,964,500	1,024,574	2,501,144	65,261	3,626,440	178,916	6,176,499	91,60	201,793	408,393	160,141
Chicago Great Western.....	1,496	3,757,245	1,287,511	5,044,756	227,863	509,192	36,591	1,561,818	60,362	2,565,187	91,38	116,818	131,677	60,877
Chicago Junction.....	12	6,698,082	39,244,809	45,942,891	5,091,142	10,140,779	285,717	20,207,336	1,101,165	37,031,218	94,36	1,882,998	297,376	925,202
Chicago, Milwaukee & St. Paul.....	1,062	26,636,072	1,506,673	28,142,745	143,266	382,237	20,340	492,021	46,405	1,087,170	101,17	12,612	37,640	84,557
Cincinnati, Ind. & Western.....	321	787,387	107,558	894,945	143,266	382,237	20,340	492,021	46,405	1,087,170	101,17	12,612	37,640	84,557
Cincinnati, New Orleans & Texas Pacific.....	337	3,355,578	893,082	4,248,660	583,379	1,256,321	91,710	1,754,518	109,933	3,383,416	80,83	910,063	135,039	773,988
Cincinnati Northern.....	251	655,759	77,783	733,542	70,182	152,101	9,489	291,429	15,618	538,796	69,76	233,473	303,353	171,071
Cleveland, Cincinnati, Chicago & St. L.....	2,408	14,487,582	3,924,075	18,411,657	1,565,050	3,921,738	318,094	8,481,970	317,539	14,770,210	69,76	5,826,956	3,810,073	3,810,073
Colorado & Southern.....	1,099	2,486,488	553,247	3,039,735	380,395	738,982	31,271	1,190,215	113,924	2,476,620	72,35	945,805	161,772	255,813
Colorado & Wyoming.....	43	44,239	2,599	46,838	31,652	46,335	711	94,647	11,806	185,151	98,72	15,000	12,601	55,757
Delaware, Lack. & Western.....	955	11,494,138	2,654,408	14,148,546	1,674,723	4,153,298	211,634	9,036,777	376,474	15,640,868	94,72	870,434	862,500	6,867
Denver & Rio Grande.....	2,585	6,952,660	1,316,528	8,269,188	921,857	2,133,029	89,813	3,090,017	217,711	6,583,973	72,63	2,481,642	365,000	1,482,654
Denver & Salt Lake.....	255	533,444	73,757	607,201	181,267	312,531	2,684	430,458	20,405	947,346	146,67	301,472	31,749	12,257
Detroit & Mackinac.....	326	271,449	97,872	369,321	70,458	135,334	6,621	243,704	20,405	497,346	146,67	301,472	31,749	12,257
Detroit, Toledo & Ironton.....	454	1,014,442	41,411	1,055,853	160,770	252,665	14,322	599,864	47,199	1,073,238	115,36	65,356	14,803	19,244
Duluth & Iron Range.....	292	267,438	67,922	334,670	195,085	304,115	1,685	380,206	45,141	1,073,238	233,42	24,997	555,028	243,863
Duluth, Missabe & Northern.....	497	292,001	131,631	423,632	373,048	542,664	6,783	516,444	1,494,837	1,949,631	286,36	97,189	31,277	1,004,499
Duluth, South Shore & Atlantic.....	614	586,857	240,223	827,080	185,006	242,516	15,019	677,625	32,862	1,167,673	113,24	136,588	61,500	198,148
Duluth, Winnipeg & Pacific.....	1,078	486,344	88,428	574,772	67,664	114,507	7,690	284,571	92,459	499,240	85,34	30,912	54,815	13,270
El Paso & Southwestern.....	1,027	2,662,943	656,318	3,319,261	723,388	662,490	33,925	961,201	24,459	2,493,669	113,24	221,245	913,250	89,435
Elgin, Joliet & Eastern.....	832	4,718,812	12	4,718,824	423,758	1,331,836	18,674	2,272,628	94,310	4,411,059	75,49	1,417,157	1,260,872	219,117
Eric.....	1,989	17,890,												



## REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of way and structures		Operating expenses		Operating ratio.	Net from railway operation.	Railway accruals.	Operating income (or loss).	Increase (or decrease) with comparison of last year.
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Traffic.	Trans- portation.	General.					
International & Great Northern.....	1,159	\$3,052,297	\$757,758	\$4,306,792	\$1,009,334	\$48,622	\$2,099,088	\$130,797	102.61	\$-112,440	\$97,503	\$-210,780	\$271,682
Kanawha & Michigan.....	176	878,306	137,404	1,075,068	144,889	7,333	423,950	36,133	94.83	55,750	75,000	-19,431	209,063
Kansas City, Mexico & Orient.....	272	311,970	51,496	401,103	142,267	11,168	223,535	148,317	137.84	-151,146	23,115	-174,910	39,179
Kansas City, Mexico & Orient of Texas.....	465	335,298	67,991	455,985	144,713	9,561	227,068	31,681	125.88	-188,039	18,919	-137,286	80,884
Kansas City Southern.....	774	3,249,837	684,809	4,389,235	581,936	81,079	1,721,706	142,596	81.58	808,364	180,042	610,853	482,246
Lake Erie & Western.....	741	2,074,575	186,222	2,457,207	267,666	46,246	1,104,869	71,323	89.92	247,635	135,001	112,853	154,701
Lake Superior & Ishpeming.....	34	16,559	814	20,870	56,946	717	30,430	7,887	72.24	12,683	17,582	-44,274	19,845
Lake Terminal.....	12	830	288,613	34,800	71,034	209,392	315,735	36,010	109.24	16,692	49,523	144,274	56,479
Lehigh & New England.....	230	946,555	7,314	955,938	105,811	25,085	379,795	36,010	79.13	207,869	49,523	158,346	156,922
Lehigh Valley.....	1,435	12,650,634	1,446,251	15,605,287	2,193,440	130,900	9,094,160	309,293	106.89	-1,075,548	528,000	-1,604,416	1,438,814
Long Island.....	398	1,465,510	2,630,311	4,721,077	769,497	35,039	3,001,045	155,853	116.38	-773,711	310,764	-1,086,037	-792,140
Los Angeles & Salt Lake.....	1,168	2,890,710	1,274,614	4,654,826	586,477	53,271	1,583,870	96,732	70.80	1,359,176	635,160	1,123,220	375,442
Louisiana & Ark.....	302	856,251	153,664	1,072,208	153,184	12,551	331,560	139,539	63.26	393,928	44,509	349,355	388,618
Louisiana Ry. & Nav Co.....	343	811,881	118,461	980,144	246,740	12,993	411,939	31,228	89.29	104,883	42,000	62,834	165,071
Louisville & Nashville.....	5,040	20,656,511	5,732,341	29,656,679	4,751,444	565,289	12,078,663	622,173	89.56	3,094,672	975,813	2,116,433	-283,901
Louisville, Henderson & St. Louis.....	199	495,908	163,371	747,331	93,249	13,389	267,844	24,716	70.32	227,139	-5,932	227,659	106,171
Maine Central.....	1,216	2,339,394	957,163	3,697,179	916,307	30,395	2,572,858	123,475	120.36	-808,200	261,225	-1,069,570	-513,962
Maryland, Delaware & Virginia.....	82	127,769	47,534	191,156	21,160	1,797	167,347	7,196	158.17	-111,204	6,000	-117,204	100,660
Michigan Central.....	1,862	13,881,201	4,044,482	20,489,948	1,802,756	179,494	9,088,837	345,932	79.72	4,153,894	735,000	3,416,681	632,165
Mineral Range.....	101	140,744	815	146,884	41,950	889	93,815	3,001	134.81	-51,131	10,800	-61,931	-68,335
Minneapolis & St. Louis.....	1,646	2,803,714	673,511	3,855,960	382,104	43,768	1,933,261	96,969	90.11	381,224	169,211	211,704	623,411
Minneapolis St. Paul & Sault Ste. Marie.....	4,243	6,412,629	1,778,619	9,406,766	1,453,867	89,011	4,971,631	250,177	95.69	405,235	828,792	-43,743	-988,683
Minnesota & International.....	194	210,177	89,744	326,238	26,188	1,537	176,634	11,452	85.05	-18,725	1,380	-20,105	3,763
Missouri Central.....	164	140,321	60,343	225,841	99,960	5,235	152,627	21,901	111.86	-162,294	1,016	-173,311	-153,184
Missouri & North Arkansas.....	365	284,469	130,915	470,388	162,078	7,999	266,034	24,898	112.48	-58,734	18,376	-77,143	-1,600
Misouri, Kansas & Texas Railroad.....	1,715	6,201,770	1,870,035	9,156,868	1,467,121	93,804	3,227,178	282,406	83.43	1,517,484	329,268	1,186,109	1,032,267
Missouri, Kansas & Texas of Texas.....	1,777	3,962,619	2,090,332	6,952,951	1,509,265	78,804	4,180,344	240,852	109.64	-667,947	178,624	-845,118	-591,144
Missouri Pacific.....	7,299	19,865,087	4,447,557	27,947,009	4,863,901	138,916	11,447,123	710,660	83.56	4,591,762	980,581	3,609,319	3,790,179
Mobile & Ohio.....	1,018	3,666,441	538,540	4,666,048	741,119	8,716	1,212,793	133,931	95.95	188,097	182,652	5,136	440,022
Monongahela Connecting.....	7	.....	.....	7,301,126	171,477	1,674	239,128	18,261	72.35	528,625	8,621	193,243	267,276
Montour R. R.....	56	189,752	4,052	202,432	54,584	3,256	97,576	20,014	147.00	-95,148	7,040	-102,189	-3,036
Nashville, Chattanooga & St. L.....	1,247	3,849,832	1,202,723	7,866,995	838,460	160,460	2,403,541	142,447	93.28	388,429	134,500	253,034	667,246
Nevada Northern.....	166	427,510	29,416	477,240	86,490	2,379	127,381	13,436	67.59	153,377	24,802	128,575	20,130
New Jersey & New York.....	47	43,578	236,776	307,907	55,679	4,923	199,021	6,673	95.90	12,593	7,654	4,933	27,767
New Orleans & N. E.....	283	1,405,872	286,726	2,697,849	299,849	35,091	1,167,739	44,068	77.92	427,716	112,023	315,274	382,520
New Orleans Great Northern.....	204	472,162	120,323	619,940	148,648	9,283	249,063	26,676	90.26	60,351	34,031	26,282	18,593
New Orleans, Texas & Mexico.....	191	394,162	118,891	556,485	151,527	10,478	189,688	21,603	85.93	78,284	34,167	44,117	52,299
New York Central.....	6,065	42,436,642	18,721,096	76,522,473	7,661,268	102,779	40,164,695	1,991,243	91.43	6,576,667	2,871,669	3,697,731	-1,899,575
New York, Chicago & St. L.....	574	6,110,121	635,131	7,617,836	571,458	105,335	3,036,731	186,959	77.69	1,476,095	45,000	1,324,306	-1,680
New York, New Haven & Hartford.....	1,965	10,974,867	10,530,870	26,321,911	3,941,721	130,515	14,788,754	880,979	101.40	-369,291	967,000	-1,341,919	-555,019
New York, Susquehanna & Western.....	135	677,142	193,706	1,002,034	135,324	8,052	854,222	24,884	127.88	-279,443	71,335	-354,368	-291,790
Newport & South Shore.....	2,202	14,474,248	1,964,771	17,877,488	2,561,784	153,775	7,848,970	382,252	98.71	5,144	23,076	-17,932	65,143
Norfolk & Western.....	6,646	18,229,389	4,297,422	25,821,403	3,550,742	233,516	10,666,201	676,592	81.72	4,705,032	2,319,187	2,382,259	-642,418
Northwestern Pacific.....	538	825,217	497,507	1,538,730	225,496	15,667	716,348	44,434	89.84	156,265	76,774	79,033	200,696
Northern Alabama.....	110	308,116	41,414	385,641	81,428	4,907	168,646	4,730	71.84	108,614	11,964	96,599	109,674
Panhandle & Santa Fe.....	772	1,361,596	401,125	1,956,148	408,326	667,080	899,729	49,529	101.46	-28,642	61,311	-90,885	318,276
Peoria & Pekin Union.....	19	104,726	12,086	147,312	37,515	1,851	269,069	13,255	95.87	18,482	28,500	-10,018	10,395
Perkinston.....	41	241,018	25,856	291,356	24,123	42	124,752	7,764	55.74	158,938	3,966	154,982	35,378
Phila. & Reading.....	1,126	16,815,071	2,365,248	20,525,539	1,894,158	6,691,362	10,598,139	457,357	96.62	691,320	341,612	349,708	2,047,947
Phila., Bethlehem & N. E.....	71	.....	.....	238,346	40,730	1,230	221,453	4,838	129.58	-70,520	3,090	-73,610	-105,835
Pitts. & W. Va.....	63	380,938	26,259	458,233	93,685	5,046	200,461	21,982	124.41	-111,899	42,622	-155,047	-29,179
Pitts. & Shawmut.....	103	376,053	14,467	393,867	69,794	4,518	149,948	13,298	84.48	61,098	335	60,763	131,042
Port Reading.....	21	405,884	.....	567,382	43,909	62	336,679	5,574	76.73	132,022	8,758	123,264	-6,939
Richmond, Fred. & Potomac.....	116	1,325,946	930,664	2,968,557	218,436	23,980	1,140,530	68,411	64.55	1,052,349	82,417	969,909	-436,607
Rutland.....	415	596,609	297,986	1,156,601	199,108	15,885	695,083	41,526	109.56	-110,609	56,657	-167,276	-37,178
St. Joseph & Grand Island.....	258	620,623	114,851	810,951	154,993	6,265	426,504	37,886	94.00	-48,608	33,711	-14,859	102,476
St. Louis, Brownsville & Mexico.....	548	970,044	521,013	1,655,989	424,373	17,721	858,495	60,035	84.19	260,184	31,900	229,376	-81,491
St. Louis-San Francisco.....	4,761	14,752,698	5,435,533	21,472,623	3,072,068	177,776	8,598,456	621,341	80.99	4,080,318	672,834	3,407,757	1,545,192
St. Louis, San Francisco & Texas.....	134	323,912	54,643	410,144	88,094	5,682	251,418	43,829	107.26	-29,685	5,640	-35,334	-87,297
San Antonio & Aransas Pass.....	736	658,706	254,171	1,074,844	404,272	18,539	564,359	54,297	128.31	-304,339	45,000	-349,608	-84,297
Seaboard Air Line.....	3,562	8,384,647	2,481,047	13,166,753	1,831,259	2,649,874	6,064,157	342,771	85.66	1,860,940	450,000	1,409,099	869,703
Seaside & Portland.....	19	117,663	293,042	373,042	18,146	1,329	192,538	4,699	90.29	-10,740	17,704	-26,798	-67,698
Southern.....	6,971	24,389,692	7,753,319	37,404,561	5,187,380	7,189,667	16,366,953	895,346	81.46	6,933,905	1,152,531	5,776,265	4,305,200
Southern Ry. in Miss.....	278	315,929	154,727	531,339	131,219	9,696	257,368	14,329	92.05	42,267	29,400	12,850	41,148
Spokane International.....	156	305,853	52,343	368,518	45,537	7,032	117,513	15,572	59.31	149,945	14,858	135,049	95,318
Spokane, Portland & Seattle.....	538	1,404,416	409,256	2,064,380	381,646	18,585	686,189	66,814	70.80	585,258	235,003	349,137	205,765
Staten Island Rapid Transit.....	23	238,156	211,776	485,994	85,921	3,734	314,199	27,685	112.16	-59,137	45,000	-104,137	-108,302
Tennessee Central.....	292	516,064	125,176	714,418	132,008	13,955	336,743	29,024	94.11	-42,086	1,899	26,182	170,894
Texas & Ft. Smith.....	87	289,466	65,909	415,433	56,400	2,827	103,052	10,149	55.34	185,498	46,916	138,584	103,467

## REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) last year.
		Freight.	Passenger.	Total.	Maintenance on way and structures.	Equipment.	Traffic.					
MONTH OF APRIL, 1920												
Texas & Pacific.....	1,946	\$5,867,545	\$2,962,260	\$8,829,805	\$1,744,244	\$2,207,373	\$104,955	\$3,227,555	\$23,026	\$8,741,274	\$8,741,274	\$8,741,274
Toledo & Ohio Central.....	458	2,228,064	188,306	2,416,370	247,850	784,233	34,160	1,236,746	54,445	2,366,663	2,366,663	2,366,663
Toledo, Peoria & Western.....	247	286,935	151,184	438,119	52,530	108,999	6,863	179,796	87,711	331,408	331,408	331,408
Toledo, St. Louis & Western.....	454	2,170,904	90,260	2,261,164	493,981	491,921	22,514	1,097,972	34,465	1,952,688	1,952,688	1,952,688
Trinity & Brazos Valley.....	368	395,678	58,061	453,739	330,591	150,577	5,326	232,839	131,811	320,928	320,928	320,928
Utster & Delaware.....	128	103,037	43,605	146,642	50,042	60,506	4,655	169,268	17,725	303,593	303,593	303,593
Union R. R. of Penna.....	40	.....	.....	.....	1,852,299	610,204	831	1,261,317	23,509	2,078,847	2,078,847	2,078,847
Union Pacific.....	3,614	20,578,714	4,505,771	25,084,485	3,177,149	5,285,514	155,913	8,907,710	78,718	18,969,903	18,969,903	18,969,903
Utah.....	98	494,250	1,662	495,912	497,257	88,268	606	117,953	7,515	249,862	249,862	249,862
Vicks, Shreveport & Pacific.....	171	671,961	277,992	949,953	1,061,011	187,595	19,067	429,309	31,008	795,976	795,976	795,976
Virginian.....	523	2,971,835	166,599	3,138,434	352,107	740,852	15,265	1,475,892	62,522	2,516,075	2,516,075	2,516,075
Wabash.....	2,472	9,571,524	2,235,995	11,807,519	1,351,433	3,545,582	401,496	6,863,036	401,496	12,209,015	12,209,015	12,209,015
Western Md.....	725	3,613,839	227,530	3,841,369	4,180,650	745,177	124,477	1,629,178	130,085	4,324,554	4,324,554	4,324,554
Western Pacific.....	1,031	2,742,940	399,241	3,142,181	568,537	610,148	64,126	1,133,768	92,040	2,528,643	2,528,643	2,528,643
Wheeling & Lake Erie.....	511	2,743,026	175,141	2,918,167	3,208,202	952,354	36,572	1,554,530	82,381	3,003,032	3,003,032	3,003,032
Wichita Falls & N. W.....	528	488,706	142,964	631,670	685,177	84,385	4,261	349,729	47,462	639,325	639,325	639,325
Wichita Valley.....	358	329,337	119,983	449,320	76,942	29,215	278	202,862	5,722	314,993	314,993	314,993
MONTH OF APRIL, 1920												
Alabama & Vicksburg.....	141	\$184,189	\$62,295	\$246,484	\$40,362	\$41,179	\$5,187	\$38,548	\$10,138	\$188,198	\$188,198	\$188,198
Ann Arbor.....	301	2,295,551	33,258	2,328,809	312,543	78,770	5,657	1,297,777	127,578	2,201,231	2,201,231	2,201,231
Archon, Toledo & Santa Fe.....	8,723	9,556,152	3,839,386	13,395,538	14,911,807	4,038,543	208,247	5,335,599	304,308	12,667,650	12,667,650	12,667,650
Atlanta, Birmingham & Atlantic.....	659	359,568	70,105	429,673	441,767	130,286	17,884	243,241	16,680	524,722	524,722	524,722
Atlantic City.....	177	106,348	178,849	285,197	239,369	46,002	1,606	176,602	1,820	284,045	284,045	284,045
Atlantic Coast Line.....	4,891	4,181,596	1,712,642	5,894,238	770,066	1,171,384	54,088	2,672,426	132,287	4,842,647	4,842,647	4,842,647
Atlantic & St. Lawrence.....	166	148,009	33,395	181,404	201,189	47,430	2,828	134,294	8,677	248,087	248,087	248,087
Baltimore & Ohio Chicago Terminal.....	90	.....	.....	.....	88,272	57,351	1,089	178,184	235,67	119,771	119,771	119,771
Baltimore & Ohio.....	5,153	11,828,223	2,225,069	14,053,292	15,226,698	2,716,821	165,960	6,661,260	456,979	14,896,979	14,896,979	14,896,979
Baltimore, Chesapeake & Atlantic.....	87	87,149	22,417	109,566	10,115	58,692	926	71,156	3,725	144,885	144,885	144,885
Banor & Aroostook.....	658	557,620	97,005	654,625	680,621	103,970	3,115	213,117	19,119	452,032	452,032	452,032
Beaumont, Salt Lake & Western.....	118	138,816	29,022	167,838	174,415	23,056	3,226	69,287	5,638	123,076	123,076	123,076
Belt Railway Co. of Chicago.....	31	.....	.....	.....	118,854	41,739	858	107,000	8,959	217,398	217,398	217,398
Bessemer & Lake Erie.....	217	810,467	35,479	845,946	868,625	127,778	27,134	118,986	30,761	769,375	769,375	769,375
Bingham & Garfield.....	36	137,400	1,504	138,904	142,239	35,858	4,231	34,709	3,247	118,155	118,155	118,155
Birmingham Southern.....	41	37,549	55,133	92,682	55,133	8,066	721	34,263	3,340	51,408	51,408	51,408
Boston & Maine.....	2,304	4,037,168	1,785,560	5,822,728	6,517,168	1,477,864	36,778	3,975,069	218,681	6,398,890	6,398,890	6,398,890
Bronklyn, Eastern District Terminal.....	296	214,305	7,453	221,758	214,305	15,877	2,160	39,416	4,220	71,821	71,821	71,821
Burlington & Susquehanna.....	589	1,214,711	142,140	1,356,851	1,410,399	218,527	13,582	634,896	38,115	1,310,972	1,310,972	1,310,972
Buffalo, Rochester & Pittsburgh.....	233	293,654	66,049	359,703	283,439	71,069	3,185	173,580	3,388	300,326	300,326	300,326
Canadian Pacific Lines (in Maine).....	1,924	1,259,287	486,756	1,746,043	1,957,022	348,416	41,802	878,303	66,655	1,679,233	1,679,233	1,679,233
Central of Georgia.....	686	1,474,806	665,585	2,140,391	381,764	378,553	20,887	1,448,646	2,653	1,693,756	1,693,756	1,693,756
Central Railway of New Jersey.....	413	287,425	90,543	377,968	431,810	73,600	7,486	331,509	20,769	580,818	580,818	580,818
Central Vermont.....	342	224,286	49,631	273,917	293,972	50,197	4,869	152,099	14,559	258,914	258,914	258,914
Charleston & Western Carolina.....	2,520	4,877,355	847,295	5,724,650	6,199,907	850,834	1,735,622	44,840	2,403,876	140,575	5,204,572	5,204,572
Chesapeake & Ohio.....	1,050	1,025,380	506,124	1,531,504	1,682,121	328,295	520,445	819,539	50,011	1,771,040	1,771,040	1,771,040
Chicago & Alton.....	1,130	1,289,572	366,715	1,656,287	1,852,939	317,225	685,973	18,310	850,473	63,941	1,949,432	1,949,432
Chicago & Eastern Illinois.....	62	61,224	13,767	74,991	83,335	23,885	1,255	56,260	3,413	99,148	99,148	99,148
Chicago, Detroit & Canada Grand Trunk Jct.....	269	448,495	63,145	511,640	583,418	114,154	11,366	371,416	29,322	682,136	682,136	682,136
Chicago & Erie.....	8,090	6,620,924	2,706,148	9,327,072	10,525,992	2,684,995	101,353	5,145,439	323,415	10,202,576	10,202,576	10,202,576
Chicago & Northwestern.....	1,496	1,039,755	42,034	1,081,789	1,161,241	561,742	28,000	714,745	54,550	1,336,033	1,336,033	1,336,033
Chicago, Great Western.....	654	675,763	248,929	924,692	1,050,562	433,343	25,855	457,746	28,721	1,085,200	1,085,200	1,085,200
Chicago, Indianapolis & Louisville.....	12	.....	.....	.....	180,679	24,448	3,177	17,078	10,478	212,129	212,129	212,129
Chicago Junction.....	10,629	8,317,675	2,301,527	10,619,202	11,879,407	2,995,188	106,827	5,317,192	375,522	10,704,456	10,704,456	10,704,456
Chicago, Milwaukee & St. Paul.....	463	343,128	95,122	438,250	336,279	86,879	8,089	185,180	13,963	352,855	352,855	352,855
Chicago, Rock Island & Gulf.....	7,656	5,287,753	2,403,461	7,691,214	8,960,969	1,764,990	112,998	4,342,217	244,799	8,949,211	8,949,211	8,949,211
Chicago, Rock Island & Pacific.....	1,749	1,522,649	639,733	2,162,382	2,328,242	425,008	363,630	980,285	79,274	1,707,314	1,707,314	1,707,314
Chicago, St. Paul, Minnesota & Omaha.....	374	205,890	24,063	230,953	239,528	71,846	3,528	126,497	11,475	337,693	337,693	337,693
Chicago, Terre Haute & South Eastern.....	.....	209,511	49,413	258,924	281,346	55,055	8,261	136,437	17,579	345,327	345,327	345,327
Cincinnati, Indianapolis & Western.....	251	205,961	18,373	224,334	236,279	41,917	45,370	188,489	5,922	184,866	184,866	184,866
Cincinnati Northern.....	2,408	3,711,646	1,435,168	5,146,814	6,179,909	1,226,936	76,306	3,273,285	129,595	4,472,267	4,472,267	4,472,267
Cleveland, Cin., Chicago & St. Louis.....	1,099	781,582	210,175	991,757	1,069,505	153,795	17,931	363,283	44,540	754,789	754,789	754,789
Colorado & Southern.....	43	23,026	936	23,962	81,711	19,921	267	41,253	4,405	77,763	77,763	77,763
Colorado & Wyoming.....	858	2,577,975	293,454	2,871,429	3,020,560	888,597	33,165	1,380,368	135,193	2,733,268	2,733,268	2,733,268
Delaware & Hudson.....	956	2,743,293	919,425	3,662,718	4,020,572	529,812	67,878	2,199,390	148,509	4,134,956	4,134,956	4,134,956
Delaware, Lackawanna & Western.....	2,585	1,700,181	599,673	2,299,854	2,490,172	384,687	608,193	800,333	83,285	1,988,775	1,988,775	1,988,775
Denver & Rio Grande.....	255	45,156	8,640	53,796	49,452	28,295	2,223	32,318	1,008	209,901	209,901	209,901
Denver & Salt Lake.....	376	93,983	35,338	129,321	137,392	22,346	4,766	87,596	3,791	134,837	134,837	134,837
Detroit & Mackinaw.....	195	243,635	43,426	287,061	322,372	44,153	4,766	127,297	12,179	325,501	325,501	325,501
Detroit, Grand Haven & Milwaukee.....	454	257,128	12,895	269,023	87,030	70,897	4					



## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) in comp. with last year.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equip- ment.	Traffic.					
Duluth, South Shore & Atlantic.....	614	\$278,690	\$109,474	\$388,164	\$88,649	\$65,608	\$6,149	78.61	\$87,866	\$20,500	\$67,358	\$69,275
Duluth, Winnipeg & Pacific.....	178	180,482	26,238	206,720	31,994	39,155	4,528	83.55	175,414	10,556	164,858	23,929
El Paso & Southwestern.....	1,027	738,830	229,361	968,191	1,031,501	205,081	13,149	68.23	703,819	100,415	227,605	145,500
Elgin, Joliet & Eastern.....	1,823	1,283,731	897,375	2,181,106	1,859,701	447,418	6,920	90.93	1,343,617	133,940	82,340	27,740
Erie.....	1,989	4,044,993	897,375	4,942,368	1,032,186	2,612,283	94,678	131.48	1,749,419	247,599	1,997,390	722,569
Florida East Coast.....	764	671,796	317,810	989,606	134,943	165,719	7,076	66.71	369,574	39,583	329,980	315,983
Fonda, Johnstown & Gloversville, steam }	31	34,300	70,958	105,258	10,705	9,205	494	61.29	42,528	5,075	37,453	1,150
Ft. Smith & Western.....	253	100,079	26,443	126,522	34,603	34,603	4,479	105.48	7,484	5,000	2,484	12,715
Ft. Worth & Denver City.....	454	554,259	304,589	858,848	163,472	189,846	4,821	87.26	115,033	23,100	91,931	154,407
Ft. Worth & Rio Grande.....	235	92,319	56,191	148,510	18,542	26,246	1,514	92.51	11,880	3,785	8,095	32,628
Galveston Wharf.....	33	364,045	134,481	498,526	58,700	31,500	2,700	87.10	35,894	14,500	21,394	19,732
Georgia & Florida.....	328	574,497	234,829	809,326	54,347	111,954	9,304	87.10	35,894	14,500	21,394	19,732
Grand Trunk Western Railway.....	355	571,827	196,929	768,756	101,148	212,840	5,775	150.69	53,525	3,350	50,175	64,968
Great Northern.....	8,175	6,535,746	1,459,233	7,994,979	847,124	291,931	14,555	112.54	108,265	51,084	57,181	285,388
Gulf & Ship Island.....	307	164,771	41,129	205,900	194,692	1,812,621	80,178	86.93	1,168,413	794,571	369,148	410,527
Georgia, Gulf, Colorado & Santa Fe.....	1,907	1,259,986	452,149	1,712,135	222,099	58,146	4,444	102.59	57,455	11,022	46,433	5,168
Gulf, Mobile & Northern.....	470	235,235	53,846	289,081	52,923	47,237	2,575	102.01	39,129	87,016	126,164	174,262
Hocking Valley.....	350	638,639	98,582	737,221	76,541	64,803	10,298	93.31	20,443	11,745	8,698	57,340
Illinois Central.....	4,799	6,596,010	2,051,317	8,647,327	1,433,708	350,417	5,944	109.49	74,164	68,458	5,706	190,384
Illinois Terminal.....	24	57,357	.....	57,357	9,475,760	3,035,232	101,522	102.61	247,106	571,588	181,774	338,727
Indiana, Harbor Belt.....	120	322,147	130,608	452,755	4,928	9,375	819	61.13	25,107	1,117	23,990	19,916
International & Great Northern.....	1,159	880,745	250,171	1,130,916	87,930	28,828	2,828	148.76	157,094	10,686	167,924	77,208
Kansas City, Mexico & O. of Texas.....	465	227,873	50,716	278,589	316,170	130,849	19,927	126.81	329,860	32,500	364,989	124,883
Kansas City Southern.....	779	920,686	229,206	1,149,892	1,229,998	316,109	19,927	120.15	59,482	25,000	84,482	156,273
Lake Erie & Western.....	741	576,887	59,328	636,215	74,607	130,849	2,887	127.06	29,471	7,700	37,171	18,951
Lake Superior & Ishpeming.....	34	5,716	.....	5,716	15,428	168,896	3,498	120.45	138,368	10,212	128,156	51,488
Lake Terminal.....	12	149,819	19,877	169,696	36,404	37,312	3,533	209.43	106,264	6,250	112,514	51,488
Lehigh & Hudson River.....	96	149,819	19,877	169,696	80,416	37,312	3,533	85.21	187,233	73,037	114,196	25,897
Lehigh Valley.....	229	262,632	21,220	283,852	244,397	269,310	28,940	91.37	58,480	35,000	23,480	75,021
Long Island.....	1,435	3,296,240	567,642	3,863,882	1,040,660	164,940	13,356	78.78	47,177	5,951	41,226	63,131
Los Angeles.....	1,398	296,595	1,004,768	1,301,363	18,937	21,399	215	96.22	122,689	8,835	113,854	32,116
Los Angeles & Salt Lake.....	1,168	529,624	1,028,957	1,558,581	18,937	21,399	215	96.22	122,689	8,835	113,854	32,116
Louisiana & Arkansas.....	302	252,523	47,743	300,266	68,400	40,900	1,649	85.21	157,203	2,000	155,203	14,805
Louisiana Ry. & Nav. Co.....	343	288,308	41,393	329,701	84,940	56,214	4,809	87.05	45,074	14,000	31,074	49,876
Louisville & Nashville.....	5,040	6,391,400	1,940,768	8,332,168	1,522,863	2,384,399	109,510	93.04	621,179	315,861	305,058	700,728
Louisville, Henderson & St. Louis.....	199	152,960	56,155	209,115	79,498	24,336	4,485	80.05	45,171	7,215	37,953	24,304
Maine Central.....	1,216	1,159,907	373,131	1,533,038	336,261	380,302	10,745	98.89	1,629,054	95,742	77,530	51,080
Maryland, Delaware and Virginia.....	82	67,924	27,306	95,230	8,693	29,971	557	118.09	17,909	2,000	19,909	14,805
Michigan Central.....	1,862	2,437,633	1,599,178	4,036,811	783,957	1,638,296	76,462	106.51	305,153	288,000	563,111	1,710,230
Midland Valley.....	388	166,293	88,572	254,865	77,334	53,320	2,797	7.652	7,183	1,806	5,377	73,031
Mineral Range.....	101	68,846	12,420	81,266	10,271	16,662	81	76.94	16,394	3,600	12,794	15,346
Minneapolis & St. Louis.....	1,646	923,960	213,620	1,137,580	221,678	341,702	18,645	101.45	17,406	68,454	86,753	2,706
Mississippi, St. Paul & S. Ste. Marie.....	4,243	2,108,063	641,285	2,749,348	604,423	599,940	31,991	91.27	265,353	290,943	29,591	259,519
Minnesota & International.....	194	88,124	29,228	117,352	25,920	18,564	4,504	79.55	25,391	6,176	19,215	16,696
Mississippi Central.....	164	56,277	19,401	75,678	25,609	28,648	2,017	117.04	13,779	3,399	17,178	4,890
Missouri & North Arkansas.....	364	96,836	37,799	134,635	50,620	30,269	2,847	107.21	10,406	5,893	16,298	40,206
Missouri, Kansas & Texas R. R. ....	1,715	1,794,347	657,454	2,451,801	586,628	813,938	37,628	91.97	214,166	112,321	101,845	87,423
Missouri, Kansas & Texas R. R. of Texas	1,739	1,430,663	720,573	2,151,236	598,654	390,003	25,314	95.47	104,687	59,583	45,094	49,752
Kansas, Oklahoma & Gulf.....	329	163,861	21,965	185,826	35,634	38,978	2,309	96.55	18,479	11,900	6,579	91,177
Missouri Pacific.....	7,299	5,071,677	1,877,715	6,949,392	1,931,569	1,870,312	141,586	98.52	112,017	238,070	134,117	608,106
Mobile & Ohio.....	1,168	1,052,060	177,707	1,229,767	1,329,289	221,743	29,435	103.35	44,662	59,653	104,315	53,366
Monongahela Connecting.....	108	231,849	25,526	257,375	214,226	38,514	331	132.77	86,164	6,293	92,457	116,673
Montour.....	56	86,147	1,424	87,571	21,993	41,128	562	70.44	76,957	3,257	73,699	86,742
Nashville, Chattanooga & St. Louis.....	1,247	1,387,350	404,621	1,791,971	265,129	398,989	45,417	138.21	34,437	2,430	36,868	25,930
Nevada Northern.....	165	117,194	8,807	126,001	26,712	22,352	1,334	70.21	39,241	8,267	30,973	20,312
New Jersey & New York.....	47	10,059	61,210	71,269	9,116	13,919	1,311	95.07	3,786	1,927	1,859	10,226
New Orleans Great Northern.....	284	147,293	46,804	194,097	39,804	33,935	3,849	84.88	30,584	12,304	18,280	17,561
New Orleans, Texas & Mexico.....	191	165,500	36,650	202,150	45,631	36,303	4,642	75.16	51,562	12,167	39,396	39,386
New York Central.....	6,069	14,757,254	7,075,953	21,833,207	2,898,211	6,361,632	229,986	88.30	2,988,004	796,198	2,191,806	829,128
New York, Chicago & St. Louis.....	574	1,431,508	81,887	1,513,395	233,671	325,909	37,250	79.68	323,394	25,000	298,394	145,253
New York, New Haven & Hartford.....	1,965	3,543,529	3,863,541	7,407,070	1,330,185	2,223,269	41,378	95.25	348,706	345,000	60,836	61,876
New York, Ontario & Western.....	569	470,700	134,401	605,101	166,112	223,623	10,788	111.01	82,993	29,100	111,393	80,642
New York, Susquehanna & Western.....	135	142,865	46,340	189,205	43,632	60,342	2,596	125.68	57,644	18,673	76,319	39,242
Newburgh & South Shore.....	7	.....	.....	.....	17,706	35,529	.....	125.91	29,516	7,599	37,515	63,319
Norfolk & Western.....	2,201	5,006,663	682,654	5,689,317	1,065,614	1,834,414	43,887	89.11	652,969	425,000	227,969	653,185
Norfolk Southern.....	905	481,338	150,439	631,777	149,183	109,907	31,421	91.11	60,019	17,332	42,687	68,613
Norfolk Pacific.....	6,635	6,311,313	1,549,745	7,861,058	2,664,727	1,558,967	73,766	92.47	647,643	737,962	92,010	1,156,285
Northwestern Pacific.....	538	243,185	194,583	437,768	503,334	341,274	4,370	85.68	72,050	25,591	46,459	17,906
Oregon Short Line.....	2,347	1,886,660	572,329	2,458,989	441,274	526,507	29,077	79.81	1,594,981	291,978	253,901	223,500
Oregon-Washington R. R. & Nav. Co.....	2,223	1,410,108	542,797	1,952,905	343,490	406,049	34,731	86.80	286,722	145,803	140,905	48,896

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.).	Way and structures.	Maintenance of equip.	Traffic.	Trans- portation.	General.	Total.
Panhandle & Santa Fe Ry.....	773	\$464,920	\$125,018	\$632,595	\$157,819	\$221,709	\$4,115	\$355,135	\$16,201	\$554,980
Peoria & Pekin Union.....	19	17,045	4,792	82,613	17,305	33,937	7	56,119	4,973	112,341
Pere Marquette.....	2,230	1,467,234	486,029	2,215,524	452,155	589,164	41,552	1,190,218	109,234	2,392,360
Perkinston R. R.....	41	73,729	8,966	86,249	7,203	3,997	16	35,597	534	47,365
Philadelphia, Bethlehem & Northeastern.....	10	5,010,113	969,712	6,369,019	1,360,441	21,553	457	73,317	1,356	110,282
Philadelphia & Reading.....	1,126	1,290,538	218,974	1,635,371	327,848	1,887,538	54,936	3,293,418	193,537	6,173,422
Pittsburgh & Lake Erie.....	103	1,071,066	244,444	1,434,444	247,848	78,004	18,741	696,253	38,081	1,806,463
Pittsburgh & West Virginia.....	63	47,484	9,997	73,952	14,344	28,431	1,245	45,654	6,617	106,162
Pittsburgh, Shawmut & Northern.....	209	83,691	7,137	93,775	26,913	53,268	1,163	54,808	18,812	136,066
Port Reading.....	21	57,654	347,187	831,711	17,782	8,867	18	72,511	4,800	103,979
Richmond, Fredericksburg and Potomac.....	116	340,101	307,208	1,181,300	84,786	95,190	5,889	341,117	24,979	612,620
Ruidland.....	415	307,698	36,732	206,205	70,496	36,829	2,027	219,609	14,082	405,119
St. Joseph & Grand Island.....	258	152,698	36,732	206,205	70,496	36,829	2,027	219,609	14,082	405,119
St. Louis, Brownsville & Mexico.....	548	515,184	171,185	720,495	122,197	85,267	12,423	247,644	23,571	490,959
St. Louis, San Francisco.....	4,757	4,380,941	1,773,004	6,556,382	1,045,066	1,605,972	59,708	2,624,266	204,422	5,322,960
St. Louis, San Francisco & Texas.....	134	126,925	181,300	124,918	28,312	27,994	1,457	71,588	5,212	134,563
San Antonio & Aransas Pass.....	736	262,842	88,941	378,903	102,224	78,903	6,589	220,293	18,713	426,808
San Antonio, Uvalde & Gulf.....	317	99,679	40,201	146,798	37,184	22,315	1,800	64,071	5,569	130,940
Seaboard Air Line.....	3,563	2,376,270	855,497	3,636,522	752,987	1,100,810	81,641	2,016,374	131,475	4,126,801
South Buffalo Ry.....	11	73,907	11,916	115,916	13,758	7,009	59,964	4,911	296,727	79,100
Southern R. R.....	6,971	7,734,798	2,773,584	11,511,227	1,368,558	1,875,966	146,044	4,911,449	296,727	8,765,188
Alabama Great Southern.....	320	507,667	182,566	743,743	63,955	131,995	17,280	529,448	51,511	593,522
Cin., New Orleans & Texas Pacific.....	338	1,072,674	327,890	1,494,493	140,725	131,297	17,280	529,448	51,511	593,522
Georgia Southern & Florida.....	402	284,506	113,224	427,669	45,843	88,813	6,560	195,105	15,395	346,293
New Orleans & Northeastern.....	207	323,146	104,974	487,687	75,111	137,166	1,422	218,429	15,395	458,298
Northern Alabama.....	110	111,162	14,051	127,386	15,899	6,309	1,422	158,939	1,659	84,432
Southern Ry. in Mississippi.....	278	69,765	45,313	126,248	47,106	20,817	2,255	84,217	8,600	163,076
Spokane International.....	156	101,932	17,412	123,105	17,306	11,724	2,256	37,925	5,020	75,300
Spokane, Portland & Seattle.....	538	430,336	151,850	632,808	76,710	29,956	4,981	209,426	20,701	401,338
Staten Island Rapid Transit.....	23	51,912	60,636	130,417	29,294	33,695	1,102	86,376	9,935	160,404
Tennessee Central.....	292	174,201	46,301	236,206	26,451	52,451	4,505	109,417	10,959	214,767
Texas & Pacific.....	93	175,386	20,951	203,993	26,462	11,724	618	68,440	6,843	113,939
Texas & Ohio Central.....	1,946	1,798,267	927,708	2,928,105	604,664	637,770	33,989	1,286,806	102,972	2,706,953
Toledo & Ohio Central.....	503	535,336	63,230	628,105	117,372	25,559	7,178	320,296	21,763	715,206
Toledo, Peoria & Western.....	247	48,962	46,523	105,408	31,123	17,753	1,753	71,526	41,119	113,526
Toledo, St. Louis & Western.....	454	670,020	34,001	705,648	149,246	150,218	10,832	279,548	12,115	602,762
Trinity & Brazos Valley.....	368	90,282	18,359	115,385	66,235	38,259	6,922	57,995	9,964	172,912
Union R. R. Co.....	128	56,248	16,749	97,778	15,712	20,723	2,166	64,307	7,882	111,467
Union Pacific.....	40	4,784,148	1,631,007	7,123,395	1,071,103	1,56,624	243	500,043	7,599	771,615
Utah Ry.....	98	104,260	596	105,306	1,286,258	1,878,069	72,411	2,505,763	304,325	6,274,622
Vicksburg, Shreveport & Pacific.....	171	268,085	90,938	382,321	16,011	25,483	162	24,816	2,249	68,722
Virginian.....	523	1,138,172	64,504	1,327,510	162,297	296,262	7,469	497,880	33,001	997,077
Wabash.....	2,473	1,787,442	815,809	2,926,393	1,005,346	1,140,070	87,475	1,911,697	149,362	4,323,954
Western Maryland.....	797	1,081,539	83,230	1,245,919	223,274	391,368	20,553	551,922	45,372	1,245,920
Western Pacific.....	1,011	540,964	203,008	792,801	170,231	143,206	28,139	282,274	28,279	675,020
Wheeling & Lake Erie.....	511	860,357	62,123	1,018,183	201,267	218,619	10,010	413,311	28,185	875,312
Wichita Valley R. R.....	256	70,721	34,793	112,705	37,463	5,687	3	48,104	1,325	93,524
Yazoo & Mississippi Valley.....	1,381	1,417,674	473,817	2,003,566	537,045	585,305	26,643	849,887	64,842	2,068,125
Alabama & Vicksburg Ry.....	141	668,352	262,714	1,043,079	154,177	200,784	20,469	388,573	39,126	815,108
Ann Arbor R. R.....	301	1,124,873	196,735	1,445,056	180,240	336,620	22,449	771,262	46,251	1,356,757
Atchison, Topeka & Santa Fe.....	8,692	44,216,378	15,919,194	67,955,622	9,101,012	15,336,713	682,441	22,415,488	1,403,492	48,610,194
Atlantic, Birmingham & Atlantic Ry.....	639	1,374,553	276,235	1,859,872	385,112	549,904	67,881	59,916	59,218	1,978,484
Atlantic City R. R.....	177	432,955	547,417	1,054,415	190,721	126,901	4,924	704,956	5,356	1,056,177
Atlantic Coast Line R. R.....	4,891	16,475,413	6,762,658	25,675,658	3,062,958	4,401,664	277,185	10,791,666	496,920	19,629,485
Atlantic & St. Lawrence.....	166	790,520	115,989	969,081	240,140	241,065	11,724	648,677	53,154	1,197,920
Baltimore & Ohio Chicago Term. R. R.....	90	49,394,067	8,326,248	63,938,696	8,664,979	20,184,676	4,588	59,980	42,273	956,671
Baltimore & Ohio R. R.....	5,153	49,394,067	8,326,248	63,938,696	8,664,979	20,184,676	4,588	59,980	42,273	956,671
Baltimore, Chesapeake & Atlantic.....	87	259,824	90,186	386,116	33,985	180,521	3,943	260,262	14,968	493,678
Bangor & Aroostook R. R.....	658	1,635,637	325,246	2,133,227	463,629	467,221	13,907	832,296	61,098	1,885,407
Beaumont, Sour Lake & Western.....	118	501,661	116,455	680,459	136,654	481,191	8,661	222,739	20,029	472,144
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FOR FOUR MONTHS OF CALENDAR YEAR 1920



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## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Railway tax accruals.	Operating (or loss), income.	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equipment.	Traffic.	Trans- portation.			
Panhandle & Santa Fe Ry.....	773	\$464,920	\$125,018	\$632,595	\$157,819	\$221,709	\$4,115	\$355,135	\$16,201	\$754,980	\$119,34
Peoria & Pekin Union.....	19	17,045	4,792	82,613	17,045	33,937	7	56,119	4,973	112,341	135,58
Pere Marquette.....	2,230	1,467,234	486,029	2,215,524	452,155	589,164	41,552	1,190,218	109,234	2,392,360	107,98
Pershing R. R.....	41	73,729	8,966	86,249	7,203	3,997	16	47,365	534	47,365	3,276
Philadelphia, Bethlehem & Northeastern.	10	5,010,113	969,732	6,369,019	1,103,441	21,553	457	73,317	1,356	110,282	99,94
Philadelphia & Reading.....	1,126	1,296,538	218,974	1,635,391	321,771	1,887,538	54,938	3,283,418	193,957	6,173,422	96,92
Pittsburgh & Lake Erie.....	224	1,071,166	1,034,434	2,105,600	321,771	764,004	18,747	696,253	58,081	1,866,433	114,12
Pittsburgh & Shawmut.....	103	47,484	9,997	73,052	21,995	38,451	1,245	45,654	8,617	106,162	92,73
Pittsburgh & West Virginia.....	63	47,484	9,997	73,052	37,837	30,836	1,267	47,737	10,191	136,066	186,25
Pittsburgh, Shawmut & Northern.....	209	83,691	7,137	93,775	26,913	53,268	1,163	54,808	18,812	154,968	165,25
Fort Reading.....	21	57,654	347,187	831,710	17,782	8,867	18	12,511	4,800	103,979	149,67
Richmond, Fredericksburg and Potomac.	116	340,101	118,130	458,231	84,786	13,080	5,889	341,117	24,979	613,620	73,65
Rutland.....	415	307,208	118,130	425,338	70,496	95,190	4,055	219,609	14,082	403,119	82,07
St. Joseph & Grand Island.....	258	152,698	36,732	206,205	73,687	36,829	2,027	23,435	12,214	252,477	122,43
St. Louis, Brownsville & Mexico.....	548	515,184	171,185	720,495	122,197	85,267	12,423	247,644	23,571	490,959	68,14
St. Louis, San Francisco.....	4,757	4,380,941	1,773,004	6,556,382	1,045,066	1,605,972	59,708	2,624,266	204,432	5,522,960	84,23
St. Louis, San Francisco & Texas.....	134	126,925	18,120	145,045	28,312	27,994	1,457	71,588	5,212	134,563	107,72
San Antonio & Aransas Pass.....	736	262,842	88,941	378,980	102,224	78,903	6,689	220,293	18,713	426,808	112,65
San Antonio, Uvalde & Gulf.....	317	99,679	40,201	146,798	37,184	22,315	1,800	64,071	5,569	130,940	89,19
Seaboard Air Line.....	3,563	2,376,270	855,497	3,636,522	752,987	1,100,810	81,641	2,016,374	131,475	4,126,801	113,48
South Buffalo Ry.....	11	53,907	116,914	170,821	7,528	9,709	418	59,964	1,461	79,110	76,66
Southern R. R.....	6,971	7,734,798	2,773,584	11,517,227	1,368,558	1,875,966	146,044	4,901,449	296,727	8,765,188	76,11
Alabama Great Southern.....	320	507,667	182,546	743,705	65,029	100,665	16,104	291,848	21,211	593,229	78,76
Cin., New Orleans & Texas Pacific.....	338	1,072,674	327,890	1,494,493	140,725	431,297	17,280	529,241	35,506	1,166,186	78,09
Georgia Southern & Florida.....	402	284,506	113,224	427,669	45,843	88,813	6,360	195,105	8,512	346,293	80,97
New Orleans & Northeastern.....	207	323,146	104,974	467,667	75,111	137,166	7,888	218,429	15,395	488,298	95,97
Northern Alabama.....	110	111,162	14,051	127,386	15,899	6,309	1,422	59,143	1,659	84,432	66,28
Southern Ry. in Mississippi.....	278	69,765	45,113	126,248	47,186	20,817	2,256	84,217	8,600	163,076	123,17
Spokane International.....	156	101,932	17,412	123,105	47,306	11,724	2,256	37,925	5,020	75,300	61,16
Spokane, Portland & Seattle.....	538	430,935	151,850	632,808	78,956	76,710	4,981	209,426	22,701	401,338	63,42
Staten Island Rapid Transit.....	23	51,912	60,636	130,417	29,294	33,695	1,102	86,736	9,935	160,404	123,00
Tennessee Central.....	292	174,201	46,301	230,206	37,451	52,451	4,505	109,417	10,959	214,767	90,92
Texas & Ft. Smith.....	93	175,386	20,951	203,993	26,462	11,724	618	68,440	6,843	113,939	5,885
Texas & Pacific.....	1,946	1,798,267	927,708	2,949,457	604,667	637,770	33,989	1,286,806	102,272	2,706,953	91,77
Toledo & Ohio Central.....	503	535,336	63,230	628,105	117,372	245,559	7,178	320,296	21,763	715,206	113,87
Toledo, Peoria & Western.....	247	48,962	46,523	105,485	31,123	27,307	1,753	71,526	4,119	135,826	128,85
Toledo, St. Louis & Western.....	454	670,020	34,001	745,648	149,246	150,218	10,882	279,548	12,215	602,102	30,418
Trinity & Brazos Valley.....	368	90,282	18,359	115,885	66,625	32,259	672	57,391	9,966	122,912	149,85
Union R. R. Co.....	128	56,248	16,749	97,778	15,712	20,725	2,166	64,407	7,882	111,467	114,00
Union Pacific.....	40	4,784,148	1,631,007	7,279,067	1,071,103	1,566,624	72,443	500,043	7,599	771,615	108,31
Utah Ry.....	98	104,260	596	105,406	16,011	25,483	162	24,816	30,425	62,746,622	86,21
Vicksburg, Shreveport & Pacific.....	171	268,085	90,938	382,321	49,951	57,377	5,971	123,430	2,249	250,540	63,53
Virginian.....	523	1,136,172	64,504	1,327,510	162,297	296,262	7,469	497,880	35,001	997,077	95,53
Wabash.....	2,473	1,787,442	815,809	2,926,493	1,005,346	1,440,070	87,475	1,911,697	149,362	4,323,954	147,75
Western Maryland.....	797	1,081,539	83,230	1,245,919	223,274	391,368	20,553	551,922	45,372	1,245,920	100,00
Western Pacific.....	1,011	540,964	203,008	792,810	170,231	143,206	28,279	282,274	28,279	675,020	85,14
Wheeling & Lake Erie.....	511	860,357	62,123	1,018,183	201,267	218,619	10,010	413,311	28,185	875,312	85,96
Wichita Valley R. R.....	256	70,721	34,793	112,705	37,463	5,687	3	48,104	1,325	92,524	82,09
Yazoo & Mississippi Valley.....	1,381	1,417,674	472,817	2,003,526	537,045	585,305	26,643	849,887	64,842	2,068,125	103,22
Alabama & Vicksburg Ry.....	141	668,352	262,714	1,043,079	154,177	200,784	20,469	388,573	39,126	815,108	78,14
Ann Arbor R. R.....	301	1,124,873	196,735	1,445,056	180,240	336,620	22,349	771,262	46,251	1,356,757	93,88
Atchafalaya, Topeka & Santa Fe.....	8,692	4,216,378	159,194	6,955,622	9,101,012	15,336,713	683,441	22,415,488	1,103,492	48,610,194	19,345,427
Atlanta, Birmingham & Atlantic Ry.....	639	1,374,553	276,253	1,859,872	385,112	526,901	67,881	939,106	59,218	1,978,484	106,37
Atlantic City R. R.....	177	432,955	547,417	1,054,415	190,721	149,854	4,924	794,956	5,356	1,056,177	100,16
Atlantic Coast Line R. R.....	4,891	16,475,413	6,762,604	25,677,658	3,062,958	4,801,864	277,185	10,791,666	496,920	19,629,485	76,44
Atlantic & St. Lawrence.....	166	790,520	115,989	969,081	240,140	241,065	11,724	648,677	53,154	1,197,920	123,61
Baltimore & Ohio R. R.....	90	832,248	735,136	1,295,521	213,982	213,982	4,588	549,980	42,273	956,671	130,14
Baltimore & Ohio R. R. Term. R. R.....	5,153	49,394,067	8,326,248	63,938,696	8,664,979	20,184,976	780,754	30,730,352	1,723,422	62,532,986	97,78
Baltimore, Chesapeake & Atlantic.....	87	259,824	90,186	386,116	33,985	180,521	3,943	260,262	14,968	493,678	127,85
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Committee was requested to bring this matter before the Interstate Commerce Commission for further consideration.

### Coal Production

A steady increase in the production of soft coal carried the output during the week ended June 12 to the highest level attained since before the switchmen's strike, according to the weekly bulletin of the United States Geological Survey. The total output, including bituminous, lignite and coal coked at the mine, is estimated at 10,332,000 net tons. Compared with the 9,568,000 tons produced in the latest preceding full week (May 23-29), this was an increase of 8 per cent. The average production per working day was 1,722,000 net tons. This was still 6 per cent below the rate just before the switchmen's strike, and 17 per cent below that of October, 1919.

Production during the first 140 working days of the last four years has been as follows:

1917.....	246,540,000	1919.....	192,489,000
1918.....	253,563,000	1920.....	231,380,000

The year 1920 is thus 38,900,000 tons ahead of 1919, but is 15,200,000 tons behind 1917 and 22,200,000 tons behind 1918.

For the week of June 5 the figures of losses due to transportation suggest a widespread improvement over the week before, the bulletin says. This was largely due to the effect of the holiday in reducing the demand for cars, and in enabling the railroads to catch up in their work. It is evident, however, that this was not the only factor in the improvement. The congestion of traffic is gradually yielding to the efforts of the railroads and it is probable that even without the occurrence of the May 30 holiday an improvement in the car supply would have been registered. The average loss due to transportation dropped from 43.3 to 39.7 per cent of full time. The betterment was most marked in the districts observing the holiday, but was not confined exclusively to them.

### N. I. T. League Holds Summer Meeting

The National Industrial Traffic League held its summer meeting at the Bellevue-Stratford Hotel, Philadelphia, Pa., on June 17 and June 18. W. H. Chandler, manager of the transportation bureau of the Boston Chamber of Commerce and president of the League, presided.

Thursday's session was characterized by a vote sanctioning the recent statement of the League before the Interstate Commerce Commission in favor of the proposed increase in freight rates. It also considered the traffic situation and adopted a resolution calling for the appointment of a committee "to ascertain to what extent daily yard checks are available to the several special terminal committees and to what extent uniform records are being kept" and to take up this matter with the American Railroad Association and the Interstate Commerce Commission "if it appears available to insure the most effective steps being taken to prevent car delays both on the part of the carriers and the shippers, with the further end in view of making as liquid as possible the available car supply, by making a careful check of the movements from the time of arrival at the terminals until the cars depart therefrom."

On Friday the meeting engaged in a general discussion of the freight situation. There was much criticism of embargoes, many localities reporting that embargoes had been placed without sufficient justification and enforced a longer time than was necessary. Some prominent members believed it desirable to get the Interstate Commerce Commission to regulate embargoes by requiring carriers to come to the commission for permission before placing any restriction on shipments. An embargo at Buffalo, N. Y., recently caused such embarrassment to lumber merchants that protest was made and it had to be modified. It was resolved that all grievances in this matter should be reported promptly to the executive committee of the League, which committee would take them up with local terminal committees or with the Interstate Commerce Commission.

A resolution was adopted calling for the appointment of a standing committee of the League to keep in touch with transportation questions in connection with the use of refrigerator and heater cars.

## Foreign Railway News

LONDON.

**German protests** in connection with the Montjoie railway have been overruled by the Commission appointed by the Supreme Council, and the railway is to be returned to Belgium.

### Jamaica Railways Building Wagons

LONDON.

A news item in the Times Trade Supplement says that Jamaica railway workshops are successfully undertaking the building of coaches and wagons. The frames are imported from North America.

### Mexico Returns Railways

Press despatches from Mexico City, dated June 20, report that the Mexican Railway was given back to its British owners on the day preceding the order of President de la Huerta.

R. A. Comford, representing the English corporation, received the road and rolling stock between Grizaba and Vera Cruz at the end of the line nearest Mexico City. Passenger traffic was inaugurated June 20.

### Railway Material Required by Egypt

LONDON.

The Ministry of Public Works for Egypt is calling for estimates for the laying of 6 miles of railway track together with 50 steel double-tip freight cars, 40 cu. ft. heavy type. The track is to be of 24 in. gage, with 18 lb. rails, and closed end type steel ties and is to be complete with all fittings and accessories, sidings, switches, etc.

### Indian Railways Burning Oil Fuel

LONDON.

It was stated in the last report of the Indian Railways that 112 locomotives were burning oil fuel. It is anticipated that, owing to the increased output of oil from the Persian concessions of the Anglo-Persian Oil Company, the use of oil fuel on the railways of Western India will in the near future be extended. Tests conducted on this system on 20 engines fitted with different types of burners showed that the work done by one ton of oil would require 1.8 tons of coal.

### Another Railway Projected

It has been announced lately that the Portuguese Government has granted to the local agent of an American concern, a concession to build a railway in the District of Mozambique. The "District of Mozambique" is not to be confused with the territory of the Mozambique Co. The railway is to run from a point on the mainland opposite the city of Mozambique to Lake Nyasa. It will open up what is considered the most promising agricultural district in Portuguese East Africa. No details have yet been given out, and it is not known when actual construction is likely to commence.

### Austrian Railways to Be Electrified

LONDON.

The Austrian Government has asked for a grant for the electrification of the State railways, says an article in "Engineering," London. The present projects provide only for hydro-electric plants of about 22,000 h. p. and the estimate would be very much smaller were it not for the depreciation of the Austrian credit. With the actual prices for imported coal and the passing of the Austrian coalfields into the possession of newly created states, the electrification of the railways has really become a vital question. The Vienna metropolitan railway is practically closed owing to the want of fuel and all the capital is lying idle. Nothing can be done without the aid of foreign capitalists, and the financial situation makes both the borrower and the lender hesitate.



### Railway Supplies in Belgium

Belgian railroad builders apparently are not yet ready to execute big contracts of their own government, for it has just ordered from the W. C. Armstrong Works in England 200 powerful locomotives. The order involves \$15,000,000, writes Consul General Henry H. Morgan from Brussels.

The Belgian railroad department has decided that hereafter in the matter of bidding for supplies of material preference will be given to Belgian industry, even if the amounts involved are greater by 5 per cent than those of foreign competition. Eventually, however, the Belgian bidder is to agree to make his price similar to that of the foreign bidder.

### Australia to Build Locomotives for Tasmanian Railway

LONDON.

The Times Trade Supplement says that the Tasmanian Railway Department has recently placed an order for ten passenger and freight locomotives with a South Australian firm. The price quoted was somewhere about \$5,000 each below that quoted by English firms. The price is for delivery in Tasmania and the first locomotive is to be delivered within nine months. The long time required for delivery by English manufacturers and the high rate of exchange in the United States hindered placing the order outside Australia.

### Railway Strike in Italy

LONDON.

A general strike on the Italian railways was declared on May 7, and the train service was stopped. The railwaymen give as an excuse for the strike the removal of a yardman at Bari. Looting and anarchist elements evidently led some of the demonstrators. A correspondent to the London "Daily Telegraph" said that the demonstrators acted as if revolution had already come and a reign of Bolshevik terror inaugurated. The real cause of the strike was said to be the Italian government's raising the price of bread, the price of which has not been increased to the same extent as other commodities.

### Railway Rolling Stock for New Zealand Government

The New Zealand Government has announced, writes Consul General Alfred A. Winslow from Auckland on April 10, as noted in Commerce Reports, that the railway department will expend about \$8,516,375 for the purchase of rolling stock for government railroads of this Dominion, covering 65 locomotives, 35 passenger cars, 12 brake vans, and 4,092 freight cars.

It is announced that the Government proposes to invite tenders in England for the manufacture of 25 large locomotives and 2,500 freight cars; and tenders in New Zealand for the building of 1,000 freight cars to be delivered in the shortest possible time.

In addition to the above the department is providing for the building of 20 locomotives, 35 passenger cars, 12 brake vans, and 592 freight cars in its own shops at the different centers. Twenty locomotives are now being built under contract by A. & G. Price, all to be delivered within five years.

Rolling stock is greatly needed, since the Government railroads are not able to meet the increasing amount of freight offered for transportation, and the accumulation of all classes of traffic throughout the Dominion is very great, there being approximately 25,000,000 feet of lumber ready for delivery where it is greatly needed in order to house the people and accommodate business throughout the Dominion.

It would seem, adds Mr. Winslow, that it would pay American interests to investigate this opening, for it is not probable that British manufacturers will be able to deliver these locomotives and cars in time to relieve the freight situation within a reasonable time, and rolling stock allotted for construction in this Dominion cannot be supplied within the next four or five years unless labor conditions change very materially. In any event much of the material to be used in the construction of this rolling stock in New Zealand must come from outside and will call for hardware, car-building accessories, and certain lines of timber.

Interested parties should correspond with the Minister of Railways covering the general contracts, and with A. & G. Price at Thames or Auckland relative to supplies for the 20 locomotives they are building.

### Anticipated Rise in England's Railway Rates

LONDON.

The English public does not seem to realize fully that a further rise in passenger fares and freight rates is inevitable, although announcements have repeatedly been made to this effect. This additional increase in rates is quite apart from the consequences of the new increase in railwaymen's wages just conceded by the National Wages Board. The London Times states that the budget figures quite correctly conveyed the inference that the 50 per cent increase in freight rates January last would place the railways on a sound financial footing, and would render any further subsidy unnecessary. But several things have happened since that time which have altered this inference. The railway shopmen have received an award amounting to \$12,500,000; the wages of other railway men have been increased under the sliding scale based upon the cost of living. The sliding scale increase means another \$17,500,000 a year.

It is further estimated that the increased cost of coal due to the recent advance in miners' wages and the increased cost of other materials, will involve the railways in a further annual expenditure of \$77,500,000, making in all a new total outlay of \$107,500,000. It is said that the present average return on capital invested in railways is a little over 3½ per cent, and the government guarantee of net receipts has not yet expired. There is no money available for the above expenditure and it must either be found by a renewed government subsidy or by a new increase in freight and passenger rates. The government and the railwaymen's leaders are agreed that a return to the unsound and ruinous policy of subsidies is impossible and therefore the only alternative is to raise the rates.

Sir Eric Geddes, the Minister of Transport, has no power to raise the rates without first consulting the Rates Advisory Committee, which he is now doing on the broader question of a general basis of rates. It is estimated, says the London Times, that the new expenditure can only be met by the addition of 20 per cent to the fares now in force, which are already 50 per cent higher than the pre-war figures. The National Wages Board has now made further concessions to the railwaymen based on an entirely new principle. Having been granted under the sliding scale the increase required by the higher cost of living, the railwaymen have now received further wages additions in response to the plea that men in other trades are getting more. The cost of this fresh increase is roughly expected to be about \$50,000,000, which will mean that the coming inevitable increase in railway rates and fares will be nearer 30 per cent than 20 per cent above the present rates. This, therefore, means that the public and business communities will pay for travel and for freight something like 90 per cent above pre-war charges.

It is well to realize, says the London Times, the direction in which these increases are working. They mean, in the first place, there will be a substantial reduction in passengers. On the other hand great hardship will be laid upon those who are compelled to travel, whatever the cost, and it is pointed out that there must be a substantial increase on the charges for season and workmen's tickets. As to freight rates, J. A. Hobson, the president of the British Association of Chambers of Commerce, pointed out that a further advance in these rates beyond the 20 per cent originally contemplated might "precipitate a serious collapse in trade in many parts of the country." He also said that if the freight rates were further increased there would be a substantial transfer of traffic to the roads. The road motor industry is becoming well organized and its promoters are able to lower their charges by arranging for return loads. Another consequence of the new doubts about railway prosperity is that the companies find it increasingly difficult to raise fresh capital. J. H. Thomas, secretary of the National Federation of Railwaymen, states that neither the public at large nor the business community have any right to expect cheap transportation at the expense of the railwaymen. This the London Times agrees with, but adds that the issue is long past that stage, and the railwaymen are now nearing the point at which they will be confronted with the unalterable economic fact that there is a limit to the working charges of any industry. When that limit is passed, the industry collapses and the men are thrown out of work.

## Equipment and Supplies

### Locomotives

THE CHICAGO & NORTH WESTERN is inquiring for 20 Pacific and 50 Mikado locomotives.

THE NOROESTE DE BRAZIL has ordered 20 locomotives from the Baldwin Locomotive Works.

THE SUGARLAND RAILWAY has ordered one locomotive from the Baldwin Locomotive Works.

THE MOGYANA RAILROAD (Brazil) has ordered 2 locomotives from the American Locomotive Company.

THE MINNEAPOLIS & ST. LOUIS has ordered 15 locomotives from the American Locomotive Company.

THE ATLANTA & WEST POINT has ordered 2 Pacific type locomotives from the American Locomotive Company.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is inquiring for 6 Mikado and 4 six-wheel switching locomotives.

THE FUJI MONIBU RAILWAY (Japan) has ordered one 2-6-2 type locomotive from the Baldwin Locomotive Works.

THE MANILA RAILROAD is inquiring for 30 locomotives, to consist of 10 each of 50 ton, 60 ton and 75 ton locomotives.

MITSUI & Co., 65 Broadway, New York, is inquiring for 40 Prairie type locomotives for the Peking-Hankow Railway.

THE FAJARDO SUGAR COMPANY, Porto Rico, has ordered one 4-wheel, oil-burning, plantation locomotive from the Bell Locomotive Works.

THE PAMPANGA SUGAR DEVELOPMENT COMPANY, Manila, P. I., has ordered 4, 4-wheel, oil-burning, plantation locomotives from the Bell Locomotive Works.

THE TEMISKAMING & NORTHERN ONTARIO, reported in the *Railway Age* of April 23 as being in the market for 4 Mikado type locomotives, has ordered this equipment from the Canadian Locomotive Company.

THE SOUTH MANCHURIAN RAILWAY (Korean lines), reported in the *Railway Age* of March 19 as being in the market for 24 Pacific locomotives, has ordered 12 of these locomotives from the Baldwin Locomotive Works.

THE PERE MARQUETTE, reported in the *Railway Age* of February 6, as inquiring for 10 Pacific type locomotives, has ordered 12 Pacific type locomotives from the American Locomotive Company. These locomotives will have 23 by 28 in. cylinders and a total weight in working order of 240,000 lbs.

### Freight Cars

THE CHICAGO & NORTH WESTERN is inquiring for 500, 40-ton stock cars.

THE RAINEY-WOOD COKE COMPANY, New York, is inquiring for 500, 70-ton hopper cars.

THE H. C. FRICK COKE COMPANY, Pittsburgh, Pa., is inquiring for 1,000, 70-ton hopper cars.

THE UNITED ALLOY STEEL CORPORATION, Canton, Ohio, is inquiring for from 25 to 50 hopper cars.

THE NATIONAL TUBE COMPANY, Pittsburgh, Pa., is inquiring for six tank cars of 12,500 gal. capacity.

THE CARNEGIE STEEL COMPANY, Pittsburgh, Pa., is renewing its inquiries for 500, 50-ton hopper car bodies.

THE MATHERS-COLIERS COMPANY, Cleveland, Ohio, is inquiring for from 400 to 700, 70-ton hopper cars.

THE PITTSBURGH MACHINERY COMPANY, Pittsburgh, Pa., is inquiring for from 50 to 100 7,000-gal. tank cars.

W. H. WARNER & Co., Pittsburgh, Pa., have ordered 250, 55-ton hopper cars from the Pressed Steel Car Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 100 cars, to consist of gondola, dump or hopper cars.

THE RAINEY-WOOD COKE COMPANY, New York, has ordered 500, 70-ton hopper cars from the Cambria Steel Company.

THE AMERICAN STEEL & WIRE COMPANY has ordered 250, 70-ton steel hopper cars from the Pressed Steel Car Company.

THE STRUTHERS FURNACE COMPANY, Cleveland, Ohio, has ordered 60, 55-ton hopper cars from the Pressed Steel Car Company.

THE ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa., has ordered 25 70-ton hopper cars from the Pressed Steel Car Company.

THE YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio, has ordered 500, 70-ton hopper cars from the Cambria Steel Company.

THE REPUBLIC STEEL & IRON COMPANY, Youngstown, Ohio, has ordered 160, 70-ton hopper cars from the Pressed Steel Car Company.

THE H. KOPPERS COMPANY, Chicago, has ordered 900, 50-ton hopper cars, and 104, 70-ton hopper cars from the Standard Steel Car Company.

THE CHILEAN STATE RAILWAYS are in the market for 50 flat cars, 85 gondolas, 30 box, 35 stock and 5 refrigerator cars, all to be of meter gage and 30 metric tons' capacity.

THE PENNSYLVANIA-OKLAHOMA OIL CORPORATION, Pittsburgh, Pa., is inquiring for from 50 to 100 tank cars of 8,000-gal. capacity and for from 50 to 100 tank cars of 10,000-gal. capacity.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 15 second-hand steel, self-clearing, hopper coal cars and for 160 wooden gondola cars of 40-ton capacity.

THE HAVANA CENTRAL, reported in the *Railway Age* of April 23 as being in the market for 200, 30-ton freight cars, and reported on May 7 as being in the market for 50 narrow gage flat cars and 50 narrow gage box cars, has ordered this equipment from the Standard Steel Car Company, and has also ordered 75 hopper cars from the same company.

### Passenger Cars

THE PERE MARQUETTE is in the market for a number of passenger train cars, including 14 coaches and 14 baggage cars.

THE CHILEAN STATE RAILWAYS are in the market for 5 sleeping cars, 2 dining cars, 5 first-class, 11 third-class, 7 baggage, and 4 composite cars, all to be of meter gage.

THE CITIZENS' TRANSPORTATION COMMITTEE in supplying trucks and drivers to relieve freight congestion at the New York piers is not making war upon union labor, as leaders of the teamsters and longshoremen proclaim. It was no use sending freight here if it was to be piled up on the docks and neglected by ukase of the labor leaders who would not make terms with the steamship companies. Business was being diverted to other ports. There would have been no attempt to organize independent trucking if the union truckmen had listened to reason and if certain steamship companies by their feebleness of initiative had not played into the hands of the strikers. The public, the third party, is always concerned in a strike that affects the prosperity and welfare of the community. The longshoremen's and truckmen's strikes, which threatened the peace as well as the welfare of New York, had become intolerable. One labor leader declares that the Merchants' Association has raised a fund to wage "open shop" warfare, when all it did was to provide for the expense of moving freight that the strikers would not touch and that steamship companies allowed to lie on their piers rather than make a final issue with the strikers.—*New York Times*.



## Supply Trade News

**C. H. Tucker**, chief engineer of the **Toledo Bridge & Crane Company**, Toledo, Ohio, has resigned.

**The Reincke-Ellis Company**, advertising counsellors, has removed its offices from the Transportation Building, to 209-215 North Michigan avenue, Chicago.

**The Lincoln Lumber Company**, a newly organized concern, equipped to serve the railroads, has established its offices at Room 1063, McCormick Building, Chicago.

A new supply sub-warehouse of the **Western Electric Company, Incorporated**, New York, has been opened in Youngstown, Ohio, at 930 West Rylan avenue. The new office reports to the Pittsburgh distributing house. **C. A. Strouss** is in charge of sales and **H. B. Bergmann** in charge of stores.

**Allan E. Goodhue**, who was managing director of the Chicago Pneumatic Tool Company's English subsidiary, the Consolidated Pneumatic Tool Company, London, England, since May 1, 1919, also director of European sales for the **Chicago Pneumatic Tool Company**, New York, has been elected vice-president in charge of sales of the latter company, with headquarters at New York. Mr. Goodhue was formerly, for a number of years, connected with the sales department of the Midvale Steel Company and the Midvale Steel & Ordnance Company in Philadelphia, Chicago and Boston, and left that company in March, 1918, to enter the service of the United States Govern-



A. E. Goodhue

ment. He was assistant manager of the steel and raw material section, Production Division of the Emergency Fleet Corporation, until January, 1919, when he became connected with the Chicago Pneumatic Tool Company.

**J. H. Kuhns**, manager of the railroad department of the Republic Rubber Company, has been elected vice-president of the **Union Asbestos & Rubber Company**, Chicago, which company has been appointed the western railroad sales agent for the Republic Rubber Company. His headquarters will be at 231 South Wells street, Chicago.

At a special meeting of the board of directors of the **SKF Industries, Inc.**, New York, on May 13, the resignation of **B. G. Prytz** as president was accepted, Mr. Prytz having been elected managing director of the parent company, with headquarters at Gothenburg, Sweden. **F. B. Kirkbride**, vice-president since the organization of the company, was elected president to succeed Mr. Prytz.

**F. L. Easton** has been appointed district sales manager of the Denver, Colo., office of the **Economy Fuse & Manufacturing Company**, Chicago, makers of Economy renewable fuses. Mr. Easton succeeds **R. M. Olsen**, who resigned recently. Mr. Easton formerly was connected with the Economy Fuse & Manufacturing Company, but more recently has been doing sales promotion work for the Gates Rubber Company.

**Edward C. Waldvogel**, who has been in the service of the **Yale & Towne Company** for fifteen years, during the past

four years of which he was general manager in charge of all sales and advertising, has been elected a director of the company. He began work in a retail hardware store and later served in the hardware jobbing business both as a buyer and a salesman. He subsequently became a traveling salesman for the Yale & Towne Company and was consecutively promoted to a position in the general offices, assistant general manager, and in 1916, general manager.

**A. Burton Cohen**, concrete engineer on the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J., has resigned to enter private practice as a consulting engineer



A. B. Cohen

with headquarters in New York and specializing in reinforced concrete design and construction of bridges, buildings and railroad structures. Mr. Cohen was born in Chicago on March 9, 1882, and was graduated from Purdue University in 1905, receiving his degree in civil engineering in 1910 for a thesis description of the Delaware river viaduct on the Lackawanna. He entered railway service in the engineering department with the Lackawanna and was assigned to preliminary estimating and location work on the 28-

mile grade revision improvement and cut-off line across the western part of New Jersey. He subsequently served as chief draftsman on the locating party and assisted in the design of the masonry structures involved in this improvement. In 1910 he was promoted to assistant engineer in charge of the design of reinforced concrete structures and later was promoted to concrete engineer. In the latter position he had charge of the design of all the concrete structures built on the cut-off line west of Scranton, Pa., including the Martins creek and Tunkhaanock creek viaducts, the largest structures of their kind in the world. Later he designed the flat-slab viaduct of the Buffalo terminal improvement which carries seven tracks and train shed.

**Willard L. Case** has been elected treasurer of the **Yale & Towne Manufacturing Company**, Stamford, Conn., succeeding **John B. Milliken**, resigned. Mr. Case was educated at Peddie Institute and Brown University and subsequently took up the study and practice of industrial engineering. He served as advisory engineer to the Audit Company, New York, and in 1910 he opened offices of his own and was engaged in consulting practice relating to problems of construction, operation, management and finance in connection with manufacturing plants, and more recently he was a special member of a firm of certified public accountants.

Recent advertisements of the **Westinghouse Union Battery Company**, Swissvale, Pa., have, unfortunately, led many to assume that the Westinghouse Electric & Manufacturing Company was entering the storage battery field. In order to clear away any misunderstanding, the Westinghouse Electric & Manufacturing Company authorizes the statement that the Westinghouse Union Battery Company is owned and controlled by the Westinghouse Air Brake Company, Wilmerding, Pa., and the Westinghouse Electric & Manufacturing Company is not in any way connected with the manufacture, sale, distribution or service of its product.

**George F. Smardon**, who served as secretary and assistant to Carl R. Gray, director of operation, United States Railroad Administration, during federal control, has become associated with the **Anchor Packing Company**, of Philadelphia, manufacturers of packings, mechanical rubber goods and asbestos products, as railway representative, eastern railroads, effective June 4. Prior to federal control Mr. Smardon served as secretary to President J. F. Fitzgerald of the

Western Maryland from July, 1913, to March, 1914, and secretary to Carl R. Gray from March, 1914, until Mr. Gray, on December 31, 1919, became president of the Union Pacific.

The **Westinghouse Electric International Company**, New York, has made appointments as follows: At East Pittsburgh, Pa., **H. F. Griffith**, assistant to general manager; **R. W. Everson**, manager of merchandising department; **H. C. Soule**, manager apparatus department, and **H. S. Reizenstein**, manager price department. At New York: **G. H. Bucher**, assistant to general manager; **J. H. Payne**, supervisor of agencies, and **F. M. Sammis**, manager of incandescent lamp department. **A. B. Cole**, assistant manager, department of publicity, Westinghouse Electric & Manufacturing Company, has been placed in charge of the advertising and promotion work for the Westinghouse International Company, and the following have been appointed foreign managers of the Westinghouse Electric International Company: **F. M. Rodgers**, London, England, European manager; **J. W. White**, Royal Bank of Canada building, Havana, Cuba, manager for Cuba, and **L. T. Peck**, Bartolome Mitre 754, Buenos Aires, manager for the Argentine.

The personnel of the **Elvin Mechanical Stoker Company**, New York is now as follows: **John B. Given**, president; **Albert G. Elvin**, vice-president in charge of operation and treasurer; **F. H. Elvin**, assistant to vice-president in charge of operation; **Frank H. Clark**, vice-president; **Frederick P. Whitaker**, secretary; **A. B. Fahnestock**, chief engineer; **H. D. Eckerson**, manager of road service, and the directors are: **E. M. Richardson**, Sherwin-Williams Paint Company; **F. P. Whitaker**, Hardy, Stancliffe & Whitaker; **Frank H. Clark**, president Chambers Valve Company; **Albert G. Elvin**, formerly of the Franklin Railway Supply Company; **John B. Given**, formerly associated with General Charles Miller on the executive staff of the Galena Signal Oil Company. The headquarters of the company are at 23 West 43rd street, New York. The Elvin stoker has been in operation on the Erie for three years and is now being tested out on the Grand Trunk. A description of this stoker and its use on the Erie was published in the *Railway Age* of January 17, 1919, page 202.

Due to the retirement of **A. F. Stillman** from active interest in the management of **The Watson-Stillman Company**, New York, several changes in the personnel have been made. **E. A. Stillman** remains as president and also has full supervision of the sales. **Carl Wigtel**, chief engineer, has been elected vice-president, **J. D. Brocks**, treasurer, and **A. Parker Nevin**, secretary; **LeRoy T. Brown** has been appointed works manager, **J. W. Delano**, assistant works manager, and **W. H. Martin**, purchasing agent. The offices of general manager and superintendent are discontinued, and **G. D. Kershaw** and **J. F. Lary**, who held these positions, are no longer connected with the company. The board of directors now consists of **E. A. Stillman**, **A. F. Stillman**, **Carl Wigtel**, **A. Parker Nevin**, **W. L. Wright**, president of the Savage Arms Company, **George T. Ordway**, of Bertram Griscom Company, and **F. A. Hutson**. **Carl Wigtel**, vice-president and chief engineer of the Watson Stillman Company, sailed on June 14 for a ten weeks' trip to Scandinavian countries. He also expects to visit England, France, Belgium and Holland. While Mr. Wigtel is going mainly for a vacation, he will also investigate new developments in the line of hydraulic machinery in all of the above countries.

The personnel of the railway department of the **Westinghouse Electric & Manufacturing Company**, East Pittsburgh, Pa., has been rearranged and promotions have been made as follows: **W. R. Stinemetz**, manager of the heavy traction section, with **Franklin W. Carter** in charge of both foreign and domestic negotiations; **E. D. Lynch**, manager of the light traction equipment section, with **George Skipton** in charge of negotiations; **J. L. Crouse**, manager of the new railway apparatus and supply section, and **K. A. Simmon**, manager of the safety car and foreign railway equipment section. Recent promotions in the service department are as follows: **G. W. Canney**, formerly service manager at East Pittsburgh, has been transferred to the office of **W. K. Dunlap**, assistant to vice-president; **L. C. Richards**, formerly district service manager

at New York, has been transferred to East Pittsburgh as electrical manager in charge of service department work in connection with all electrical apparatus including service shops; **A. D. Hunt**, of the South Philadelphia works, has been made steam service manager in charge of service department work in connection with all steam apparatus; **W. H. Keller** has been made office service manager at East Pittsburgh in charge of all clerical, cost and accounting details of the service department. And will report directly to **W. K. Dunlap**, assistant to vice-president, in charge of service.

**R. J. Barry**, heretofore superintendent of car service of the Southern Pacific, Louisiana and Texas lines, has been appointed general manager of the **National Oil Company**, New York, with headquarters at Houston, Tex. Mr. Barry was born in Ireland on November 13, 1876 and was educated at Blackrock College. He entered railway service in October, 1896 with the Boston & Maine as a laborer at a fuel station at Lawrence, Mass. He was promoted to switchman in 1897. In 1898 he became a reporter, serving as war correspondent for the Boston Globe during the Boer War. In 1903 he went to the Southern Pacific and was a clerk at Oakland, Cal., and served successively, until 1909, as timekeeper in the superintendent's office, yard clerk, agent at Oakland Wharf station, supervisor of yards and stations, and inspector of transportation. For the following three years he was general agent for the Alaska Steamship Company and general freight and passenger agent of the Copper River & Northwestern, with headquarters at Cordova, Alaska. In 1912 he returned to the Southern Pacific as chief clerk to the superintendent, with headquarters at Sacramento, Cal., and one year later was appointed inspector of transportation in Louisiana and Texas. In 1914 he was appointed superintendent of the Austin division and in 1915 was transferred to the Houston and Galveston divisions. He was promoted to superintendent of car service and acting superintendent of transportation in 1917, which position he held until his recent appointment. Mr. Barry has specialized in fuel consumption and the use of fuel oil for locomotives, and in his new work will have charge of all terminals in Mexico and the United States and the operation of a fleet of oil ships, tugs and barges between Tampico, Mex., and United States ports.

## Obituary

**Charles Blizard**, third vice-president of the **Electric Storage Battery Company**, died on Saturday, June 12. He was born at Stevens Point, Wis., in 1864, and was educated in the east,



C. Blizard

graduating from the Brooklyn Polytechnic Institute. In October, 1893, he became associated with the Electric Storage Battery Company and was in the service of the company a total of 27 years. He was at first manager of the New York office and in 1900 he was moved to the home office in Philadelphia in charge of sales. In April, 1906, he was made third vice-president, which position he retained until the time of his death. Mr. Blizard was a prominent figure at conventions of Central Lighting and Power Companies,

and for years served on the exhibition committee. He was also an active member of the Electric Vehicle Association, serving on various committees, and he later continued his activities in the electric vehicle section of the National Electric Light Association. He was a member of the board of governors, chairman of the finance committee of the Associated Manufacturers of Electrical Supplies, and was his company's official representative in the Motor Accessory Manufacturers' Association.



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# ANNUAL REPORT

## Southern Pacific Company—Report of the Board of Directors

NEW YORK, N. Y., June 17, 1920

TO THE STOCKHOLDERS OF THE SOUTHERN PACIFIC COMPANY:  
Your Board of Directors submits this report of the operations and affairs of the Southern Pacific Company and of its Proprietary Companies for the fiscal year ended December 31, 1919.

The Federal Government, which took over the railroad and steamship lines of your Company on December 28, 1917, as explained in last year's report, continued, during the year 1919, in the possession and control of your Company's properties.

The following table shows the results of Federal operation of your Company's lines during 1919 compared with the results of Federal operation during 1918:

	Calendar Year 1919	Calendar Year 1918	+ Increase — Decrease	Per Cent
1. Average miles of road operated..	11,043.11	11,101.54	—	58.43 .53
RAILWAY OPERATING REVENUES				
2. Freight .....	\$163,011,660.07	\$151,079,622.80	+ \$11,932,037.27	7.90
3. Passenger .....	59,371,140.37	53,247,921.76	+ 6,123,218.61	11.50
4. Mail and express .....	7,838,257.82	7,839,380.77	—	1,122.95 .01
5. All other transportation ....	2,446,116.63	3,548,305.77	—	1,102,189.14 31.06
6. Incidental .....	6,886,516.60	5,851,254.45	+ 1,035,262.15	17.69
7. Joint facility—Credit .....	128,988.99	83,207.96	+ 45,781.03	55.02
8. Joint facility—Debit .....	25,408.13	38,487.30	+ 13,079.17	33.98
9. Total railway operating revenues..	\$239,657,272.35	\$221,611,206.21	+ \$18,046,066.14	8.14
RAILWAY OPERATING EXPENSES				
10. Maintenance of way and structures .....	\$34,799,542.71	\$25,824,725.78	+ \$8,974,816.93	34.75
11. Maintenance of equipment ....	47,969,373.75	40,747,834.97	+ 7,221,538.78	17.72
12. Total maintenance .....	\$82,768,916.46	\$66,572,560.75	+ \$16,196,355.71	24.33
13. Traffic .....	2,162,186.46	2,249,360.43	—	87,173.97 3.88
14. Transportation .....	93,274,666.63	86,084,897.92	+ 7,189,768.71	8.35
15. Miscellaneous operations .....	4,231,266.21	3,330,398.66	+ 900,867.55	27.05
16. General .....	4,880,882.38	4,925,247.01	—	44,364.63 .90
17. Transportation for investment—Credit .....	390,435.63	440,092.93	+ 49,657.30	11.28
18. Total railway operating expenses..	\$186,927,482.51	\$162,722,371.84	+ \$24,205,110.67	14.88
19. Net revenue from railway operations .....	\$52,729,789.84	\$58,888,834.37	— \$6,159,044.53	10.46
20. Railway tax accruals .....	\$9,478,376.72	\$9,398,681.08	+ \$79,695.64	.85
21. Uncollectible railway revenues..	51,694.91	59,675.69	—	7,980.78 13.37
22. Railway operating income..	\$43,199,718.21	\$49,430,477.60	— \$6,230,759.39	12.61
23. Equipment rents (Net credit)..	378,081.20	3,661,808.59	— 3,283,727.39	89.68
24. Joint facility rent (Net credit)..	*9,423.90	195,089.66	— 204,513.56	104.83
25. Net of items 22, 23, and 24 .....	\$43,568,375.51	\$53,287,375.85	— \$9,719,000.34	18.24
26. Miscellaneous income .....	418,906.59	104,901.62	+ 314,004.97	299.33
27. Expenses in excess of revenues prior to January 1, 1918, included in above, but charged against the corporation .....	\$76,977.51	2,533,000.13	— 2,609,977.64	103.04
28. Net income from Federal operations .....	\$43,910,304.59	\$55,925,277.60	— \$12,014,973.01	21.48
29. Standard return .....	48,244,660.03	48,167,342.56	+ 77,317.47	.16
30. Standard return in excess of Federal income for 1919 .....	\$4,334,355.44	.....	.....	.....
31. Federal income for 1918, in excess of standard return .....	.....	\$7,757,935.04	.....	.....

\*Debit. †Represents revenues in excess of expenses prior to January 1, 1918, included in above statement, but credited to the corporation. ‡Represents the annual compensation payable by U. S. Government for use of Southern Pacific Transportation System, as fixed in the agreement with the Director General of Railroads.

Following is a summary of operating revenues, operating expenses, and net revenue from railway operations for years 1919 and 1918 under Federal control; also, for comparative purposes, for the year 1917—the last year of private operation preceding Government control:

	1919	1918	+ Increase — Decrease	Percent	1917
Operating revenues .....	\$239,657,272.35	\$221,611,206.21	+ \$18,046,066.14	8.14	\$193,971,489.54
Operating expenses .....	186,927,482.51	162,722,371.84	+ 24,205,110.67	14.88	120,601,822.82
Net revenue from railway operations .....	52,729,789.84	58,888,834.37	— 6,159,044.53	10.46	73,369,666.72
Operating ratio, Pct. ....	78.00	73.43	+ 4.57	6.22	62.18

The above table illustrates the disproportionate increase in expenses compared with revenues and the fall in net despite higher gross. In 1919 after paying expenses of operating, there was left out of each dollar of revenue only 22 cents, compared with 38 cents remaining in the last year previous to Federal control.

Comparing 1919 with 1918, the increase in operating revenue of \$18,046,066.14, or 8.14%, resulted principally from the fact that passenger and freight rates were not increased until June of 1918 and the beneficial effect of this increase was felt in only half of that year.

There was a decrease of 6.52% in ton miles of revenue freight, attributable chiefly to the diversion of traffic from your lines during the whole of 1919, which was practiced during only a part of 1918. This diversion of traffic during the operation of your lines by the Government resulted from the closing of traffic agencies, the disturbance of relationship of both rates and service, and arbitrary routing of freight by Governmental agencies.

The revenue passengers carried one mile increased 7.28% which, partially offset the decrease in the volume of freight business, and was due to the transportation of discharged and furloughed soldiers and to the general prosperity of the people of the country.

The increase of \$24,205,110.67, or 14.88%, in operating expenses, compared with a decrease of 5.71% in train mileage, was due principally to additional increases in wages and prices of material, the effect of these increases over previous year being:

Increased wages .....	\$11,420,000
Increase in price of fuel .....	2,534,500
Increase in prices of other materials .....	4,879,000

Total increase in wages and material prices.....\$18,833,500

The annual report showed increases in 1918 over 1917 from these causes amounting to \$34,338,000, the total increase in wages and material prices in the two years of Federal control, therefore, being \$53,171,000, which increased operating expenses substantially forty per cent.

There was an increase of \$5,371,611 in operating expenses in 1919 over 1918 not accounted for by increased wages or prices.

Considerable improvement due principally to reduction in speed and to superheating was effected in fuel consumption in 1919 over 1918, which year had fallen below the record of the year previous. The gross ton miles moved per pound of coal (oil equated to coal on basis of four barrels of oil to one ton of coal) were:

	Passenger Service	Freight Service
1919 .....	5.08	6.67
1918 .....	5.05	6.06
1917 .....	5.10	6.11

Other transportation results for the year 1919 were as follows:

	Tons All Freight per Loaded Car	Percent Loaded to Total Freight Car Miles	Tons All Freight per Train	Passengers per Train
1919 .....	25.42	69.74	641.41	81.76
1918 .....	26.98	71.02	641.28	73.27
1917 .....	25.34	72.14	602.98	62.82

### PROPERTIES AND MILEAGE

The transportation lines of the Southern Pacific Company, and of certain affiliated companies herein referred to as "Proprietary Companies," constituting the Southern Pacific System, operated by the Government at December 31, 1919, were as follows:

DIVISIONS	FIRST MAIN TRACK	ADDITIONAL MAIN TRACK	SIDINGS	FER- RIES	WATER LINES
A—MILEAGE OF LINES OWNED BY OR LEASED TO SOUTHERN PACIFIC COMPANY:					
1. Owned by Southern Pacific Company .....	528.06	15.35	202.53	...	4,400.00
2. Leased from Proprietary companies:					
(a) Central Pacific Railway .....	2,289.00	431.42	931.62	9.90	125.00
(b) Oregon & California Railroad .....	701.38	4.57	187.53	...	...
(c) Southern Pacific Railroad .....	3,475.74	208.16	1,510.20	3.00	...
(d) South Pacific Coast Railway .....	106.70	20.46	49.25	3.00	...
B—MILEAGE OF LINES OWNED BY OR LEASED TO THE FOLLOWING PROPRIETARY COMPANIES:					
1. Arizona Eastern R. R. Co. ....	377.74	....	78.86	...	...
2. Houston & Texas Central R. R. Co. ....	856.57	12.94	265.52	...	...
3. Galveston, Harrisburg & San Antonio Ry. Co. ....	1,381.90	40.87	385.41	...	...
4. Texas & New Orleans R. R. Co. ....	469.65	8.78	220.57	...	...
5. Houston, East & West Texas Ry. Co. ....	190.94	....	57.93	...	...
6. Houston & Shreveport R. R. Co. ....	40.72	.69	7.42	...	...
7. Morgan's Louisiana & Texas R. R. & S. S. Co. ....	400.67	58.35	250.56	3.00	...

1919 Compared with 1918

	1919	1918	+ Increase — Decrease	Percent	1917
Operating revenues .....	\$239,657,272.35	\$221,611,206.21	+ \$18,046,066.14	8.14	\$193,971,489.54
Operating expenses .....	186,927,482.51	162,722,371.84	+ 24,205,110.67	14.88	120,601,822.82
Net revenue from railway operations .....	52,729,789.84	58,888,834.37	— 6,159,044.53	10.46	73,369,666.72
Operating ratio, Pct. ....	78.00	73.43	+ 4.57	6.22	62.18

8. Louisiana Western R. R. Co. ....	207.74	....	83.98	...	....
9. Lake Charles & Northern R. R. Co. ....	72.66	....	11.32	...	....
10. Iberia & Vermilion R. R. Co. ....	21.44	....	10.95	...	....
11. Southern Pacific Terminal Co. ....	.....	....	25.68	...	....
Total .....	11,120.91	801.59	4,279.33	18.90	4,525.00
Less mileage used in connection with property of two or more of above companies and included in mileage of each.....	31.23	29.99	30.33	...	....
Total miles of road operated by Government at December 31, 1919.....	*11,089.68	771.60	4,249.00	18.90	4,525.00
Total miles of road operated by Government at December 31, 1918.....	11,085.32	763.62	4,235.88	18.90	4,525.00
Increase .....	4.36	7.98	13.12	....	.....
Average miles of road operated by Government during year 1919.....	11,043.11	771.13	.....	....	.....

\*Includes 2.48 miles owned jointly with other companies, 4.37 miles leased from other companies, and 79.27 miles operated under trackage rights; and excludes 41.34 miles of owned lines leased to other companies. †Excludes .49 miles of siding at Maricopa, Arizona, owned jointly by Arizona Eastern R. R. Co. and Southern Pacific R. R. Co. which was duplicated in last year's report.

In addition to the mileage above tabulated, the Southern Pacific Company solely controls through ownership of capital stock, 863.89 miles of Affiliated Companies and 1,240.52 miles of the Southern Pacific R. R. Co. of Mexico; and jointly controls (through ownership of capital stock in equal proportions with the Atchison, Topeka & Santa Fe Ry. Co.) 523.46 miles of the Northwestern Pacific Railroad, and 59.66 miles of the Sunset Railway, a GRAND TOTAL OF 13,777.21 MILES.

## INCOME ACCOUNT

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED  
(Excluding offsetting accounts)

	Year ended December 31, 1919	Year ended December 31, 1918	+Increase —Decrease	Per Cent
1. Standard return..*	\$48,244,660.03	\$48,167,342.56	+	\$77,317.47 .16
OPERATING INCOME				
2. Revenues from miscellaneous operations .....	\$14,033,155.75	\$20,397,863.81	—	\$6,364,708.06 31.20
3. Expenses of miscellaneous operations .....	7,565,331.96	15,921,426.68	—	8,356,094.72 52.48
4. Net revenue from miscellaneous operations .....	\$6,467,823.79	\$4,476,437.13	+	\$1,991,386.66 44.49
5. Taxes on miscellaneous operating property .....	223,706.58	159,239.80	+	64,466.78 40.48
6. Miscellaneous operating income .....	\$6,244,117.21	\$4,317,197.33	+	\$1,926,919.88 44.63
7. Total of items 1 and 6...	\$54,488,777.24	\$52,484,539.89	+	\$2,004,237.35 3.82
NONOPERATING INCOME				
8. Income from lease of road .....	\$28,497.04	\$27,031.90	+	\$1,465.14 5.42
9. Miscellaneous rent income .....	731,015.97	683,722.22	+	47,293.75 6.92
10. Miscellaneous non-operating physical property .....	360,069.30	420,681.73	—	60,612.43 14.41
11. Separately operated properties—Profit .....	24,909.46	50,176.24	—	25,266.78 50.36
12. Dividend income.	1,182,038.97	2,304,208.06	—	1,122,169.09 48.70
13. Income from funded securities— Bonds and notes —Affiliated and other companies	2,370,301.11	2,297,166.57	+	73,134.54 3.18

14. Income from funded securities—Investment advances—Affiliated companies .....	443,942.36	298,335.09	+	145,607.27	48.81
15. Income from unfunded securities and accounts ....	355,563.95	556,093.61	—	200,529.66	36.06
16. Income from sinking and other reserve funds ....	742,040.20	714,439.71	+	27,600.49	3.86
17. Miscellaneous income .....	207,337.72	102,839.25	+	104,498.47	101.61
18. Revenues prior to January 1, 1918.....	414,834.36	535,046.94	—	120,212.58	22.47
19. Total nonoperating income.....	\$6,860,550.44	\$7,989,741.32	—	\$1,129,190.88	14.13
20. Gross income .....	\$61,349,327.68	\$60,474,281.21	+	\$875,046.47	1.45

DEDUCTIONS FROM  
GROSS INCOME

21. Rent for leased roads .....	\$267,019.89	\$329,588.93	—	\$62,569.04	18.98
22. Miscellaneous rents .....	717,692.48	590,407.88	+	127,284.60	21.56
23. Miscellaneous tax accruals .....	706,591.76	684,460.70	+	22,131.06	3.23
24. Railway tax accruals—War taxes..	2,433,617.90	1,707,269.24	+	726,348.66	42.54
25. Interest on funded debt—Bonds and notes .....	22,701,121.06	23,767,103.53	—	1,065,982.47	4.49
26. Interest on funded debt—Nonnegotiable debt to affiliated companies..	147,496.30	114,256.18	+	33,240.12	29.09
27. Interest on unfunded debt....	375,066.92	146,352.61	+	228,714.31	156.28
28. Amortization of discount on funded debt .....	292,131.27	286,965.82	+	5,165.45	1.80
29. Corporate operating expenses....	1,489,844.83	726,191.58	+	763,653.25	105.16
30. Miscellaneous income charges....	332,281.36	368,721.49	—	36,440.13	9.88
31. Expenses prior to January 1, 1918 .....	337,856.85	3,068,047.07	—	2,730,190.22	88.99
32. Total deductions from gross income .....	\$29,800,720.62	\$31,789,365.03	—	\$1,988,644.41	6.26
33. Net income.....	\$31,548,607.06	\$28,684,916.18	+	\$2,863,690.88	9.98

DISPOSITION OF NET  
INCOME

34. Income applied to sinking and other reserve funds ..	\$1,022,863.92	\$997,111.48	+	\$25,752.44	2.58
35. Dividend appropriations of income†	17,478,459.12	16,404,509.25	+	1,073,949.87	6.55
36. Total appropriations .....	\$18,501,323.04	\$17,401,620.73	+	\$1,099,702.31	6.32
37. Income balance transferred to credit of profit and loss .....	\$13,047,284.02	\$11,283,295.45	+	\$1,763,988.57	15.63
38. Per cent of net income on outstanding capital stock of Southern Pacific Company .....	10.45	10.38	+	.07	.67

\*Represents the annual compensation payable by U. S. Government for use of Southern Pacific Transportation System, as fixed in the agreement with the Director General of Railroads. †This year's figures include \$334.00, and last year's figures, \$454.00, representing dividends on stocks of Proprietary Companies held by the Public.

The increase of \$77,317.47 in Standard Return (line No. 1) is due to the fact that the amount of the standard return of the Southern Pacific Terminal Company shown in last year's report was based on the compensation for terminal properties operated by the Director General; while the figures for this year include the compensation for Terminal Company properties leased



to the public, as well as for those operated by the Director General, such leased properties having been included in the agreement with the Director General executed January 10, 1920. This increase is partially offset by a decrease of \$38,303.12 in Miscellaneous Rent Income, representing the rental for last year from such leased properties, which was dealt with in last year's report as accruing to the Company.

As complete data are not yet available for the computation of interest on the accounts with the Government, or for the computation of the additional compensation payable to the Company for use of additions and betterments, new equipment, and road extensions completed during Federal control, the income statement does not include any amount representing such interest or such additional compensation. It is estimated, however, that the interest due the Company is in excess of that due to the Government; and that a considerable amount of additional compensation is due to the Company under the terms of our contract with the Director General.

#### OPERATING INCOME

Of the increase of \$1,926,919.88 in Miscellaneous Operating Income (line No. 6) \$1,925,629.63 represents the increase in the net operating income of the California Fuel Oil Department, the result, principally, of an increase of 1,418,000 barrels, or 20 per cent, in sales of produced oil, and of an increase of 15.85 cents in the average price per barrel due to an advance of 25 cents per barrel in the price of produced oil which went into effect in May, 1918. The decrease in gross revenues from, and in expenses of, Miscellaneous Operations (lines Nos. 2 and 3), is due to the fact that during the year 1919 the Federal Administration purchased from the Fuel Oil Department only a small amount of fuel oil other than that produced from the company's own wells, with the result that the Fuel Oil Department's dealings in purchased oil decreased 6,529,000 barrels, or about 79 per cent. The increase of \$47,293.75 in Miscellaneous Rent Income (line No. 9) is the result, principally, of an increase of about \$90,000 in rent received for use of property not required for railway operations, caused by an increase in the rental rate, less the decrease of \$38,303.12 on account of rental for last year from properties of the Southern Pacific Terminal Company, which was dealt with in last year's report as accruing to the Company instead of to the Director General, as explained above.

The decrease of \$60,612.43 in Miscellaneous Nonoperating Physical Property (line No. 10) is due, principally, to a decrease in the net income from lands belonging to Central Pacific Railway Company and pledged under that company's Three and One-half Per Cent. Mortgage.

The decrease of \$25,266.78 in Separately Operated Properties—Profit (line No. 11) represents this company's proportion of the decrease in profits from operation of Pintsch gas plants at Houston and Portland.

The increase of \$145,607.27 in Income from Funded Securities—Investment Advances (line No. 14) is the result, principally, of crediting to income this year interest on investment advances which were repaid during the year.

The decrease of \$200,529.66 in Income from Unfunded Securities and Accounts (line No. 15) is due, principally, to a decrease in the interest received on bank balances.

The increase of \$104,498.47 in Miscellaneous Income (line No. 17) represents, principally, the gain in exchange on funds remitted to Paris in payment of interest on Central Pacific Railway Company Four Per Cent. Thirty-Five Year European Loan bonds.

The credits to Revenues Prior to January 1, 1918, (line No. 18) and the debits to Expenses Prior to January 1, 1918, (line No. 31) represent, respectively, the collection and payment during the year, through the Federal Administration, of revenues and expenses, commonly called "lap-over" items, applicable to the period prior to January 1, 1918. For the reason set forth in the last paragraph on page 15 of last year's report the treatment of these items as credits and debits to income, as required by the Interstate Commerce Commission, has had the effect of understating the income for last year by \$2,533,000.13, and of overstating the income for this year by \$76,977.51.

#### DEDUCTIONS FROM GROSS INCOME

The decrease in Rent for Leased Roads (line No. 21) is the result, principally, of a rental payment made last year, covering rental accrued prior to January 1, 1918, which had been in controversy for several years.

The increase of \$127,284.60 in Miscellaneous Rents (line No. 22) represents, principally, an increase in rental for pipe line used by the Fuel Oil Department.

Of the decrease of \$1,065,982.47 in Interest on Funded Debt—Bonds and Notes (line No. 25) the sum of \$920,429.89 is due to the conversion of Southern Pacific Company Four Per Cent. and Five Per Cent. Convertible Bonds into common stock; and the remainder is due to the retirement of bonds, principally through accretions to sinking funds.

The increase of \$228,714.31 in Interest on Unfunded Debt (line No. 27) represents, principally, interest paid on funds borrowed for the purchase of Liberty Loan Bonds.

The increase in Corporate Operating Expenses (line No. 29) is due to the fact that such expenses for the period from January 1, 1918, up to the time of the appointment of Federal Managers, in the latter part of June, 1918, were borne by the Federal Administration.

The increase of \$1,073,949.87 in Dividend Appropriations of Income (line No. 35) is due to the issue of Common stock against Southern Pacific Company Four Per Cent and Five Per Cent Convertible Bonds surrendered and cancelled.

On December 31, 1919, the principal of advances to the Southern Pacific Railroad Company of Mexico amounted to \$39,546,127.19. Interest accruing on these advances has not been taken into the income of the Southern Pacific Company.

#### CAPITAL STOCK

The capital stock of the Southern Pacific Company outstanding at the beginning of the year amounted to..... \$276,442,905.64

Issued during the year:

Common Stock issued at 130 in exchange for \$26,657,150.00, par value, Four Per Cent. Twenty-Year Convertible Gold Bonds and Bond Scrip, at par, surrendered and cancelled..... \$20,505,500.00

Common stock issued in exchange for a like amount of Five Per Cent. Twenty-Year Convertible Gold Bonds surrendered and cancelled..... 5,076,500.00 25,582,000.00

Amount of Southern Pacific Company capital stock outstanding December 31, 1919..... \$302,024,905.64

There was no change during the year in the capital stocks of the Proprietary Companies.

The amount outstanding December 31, 1919, was as follows:

Preferred stock..... \$29,400,000.00  
Common stock..... 317,432,400.00

\$346,832,400.00

Capital stocks of Proprietary Companies outstanding December 31, 1919, were held as follows:

In hands of public.....	\$76,100.00
Owned by Southern Pacific Company.....	\$346,456,300.00
Owned by Morgan's Louisiana & Texas Railroad & Steamship Company.....	300,000.00
	<u>346,756,300.00</u>
	<u>\$346,832,400.00</u>

#### FUNDED DEBT

The funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1918, was as follows:

Southern Pacific Company.....	\$201,189,710.00
Proprietary Companies.....	445,298,789.78
Total outstanding December 31, 1918.....	<u>\$646,488,499.78</u>

Retired during the year:

#### SOUTHERN PACIFIC COMPANY

Four Per Cent. Twenty-Year Convertible Gold Bonds:	
Retired at par in exchange for \$20,505,500.00, par value, common stock issued at 130.....	\$26,657,150.00
San Francisco Terminal First Mortgage Four Per Cent. Bonds:	
Purchased from payments to sinking fund.....	6,300.00
Five Per Cent. Twenty-Year Convertible Gold Bonds:	
Retired in exchange for a like amount of common stock issued.....	5,076,500.00
Equipment Trust Certificates:	
Series A, Due March 1, 1919, paid off.....	\$1,012,000.00
Series B, Due September 1, 1919, paid off.....	201,000.00
Series C, Due December 1, 1919, paid off.....	117,000.00
Series D, due May 1, 1919, paid off.....	511,000.00
	<u>1,841,000.00</u>

#### CENTRAL PACIFIC RAILWAY COMPANY

First Refunding Mortgage Four Per Cent. Bonds:	
Purchased from payments to sinking fund.....	\$31,000.00
Three and One-half Per Cent. Mortgage Gold Bonds:	
Purchased from proceeds of sale of lands.....	\$372,000.00
Purchased from payments to sinking fund.....	29,000.00 401,000.00
	<u>432,000.00</u>

#### OREGON & CALIFORNIA RAILROAD COMPANY

First Mortgage Five Per Cent. Bonds:	
Purchased from payments to sinking fund.....	140,000.00

#### SOUTH PACIFIC COAST RAILWAY COMPANY

First Mortgage Four Per Cent. Bonds:	
Purchased from payments to sinking fund.....	227,000.00

#### SOUTHERN PACIFIC RAILROAD COMPANY

First Refunding Mortgage Four Per Cent. Gold Bonds:	
Purchased from payments to sinking fund.....	15,000.00

#### TEXAS & NEW ORLEANS RAILROAD COMPANY

Payment to State of Texas account of School Fund Debt.....	4,888.05
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Total retired during the year.....	<u>34,399,838.05</u>
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Amount of funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1919.....	<u>\$612,088,661.73</u>
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The outstanding securities are held as follows:

In hands of public.....	\$509,765,445.31
Owned by Southern Pacific Company.....	\$87,119,216.42
Owned by Proprietary Companies.....	2,337,000.00
Held in sinking funds of Proprietary Companies.....	12,867,000.00
Total.....	<u>\$612,088,661.73</u>

As a result of protracted negotiations your Company has entered into an agreement, dated January 15, 1920, with the Director General of Railroads providing that payment for the 1,000 box cars, which the Company was compelled to take over from the Director General as explained on page 10 of last year's report, is to be made in fifteen equal annual installments, evidenced by Equipment Trust Notes, dated January 15, 1920, divided into fifteen series, each for an aggregate principal amount equal to one-fifteenth of the total purchase price of the equipment, maturing, respectively, on the 15th day of January in each of the years 1921 to 1935, both inclusive, with interest at 6 per cent. per annum, payable semi-annually on January 15th and July 15th in each year. The agreement stipulates that while the precise purchase price of the 1,000 cars has not been finally computed it shall not be less than \$2,815,000 nor more than \$3,072,450. The minimum purchase price of \$2,815,000 has been paid by the execution of notes aggregating \$2,814,000, and the payment of \$1,000 in cash; and upon the delivery of a certificate of the Director General and the manufacturers of the equipment, on or before August 1, 1920, specifying the total purchase price of such equipment, additional notes are to be executed and delivered to an aggregate amount equal to the difference between the total purchase price, as specified in such certificate, and the minimum purchase price. The aggregate amount of all notes to be executed and delivered under the agreement shall not, however, in any event, exceed the maximum purchase price of \$3,072,450.

## BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED  
ASSETS—DECEMBER 31, 1919, COMPARED WITH DECEMBER 31, 1918, EXCLUDING OFFSETTING ACCOUNTS

ASSETS	December 31, 1919	December 31, 1918	Increase	Decrease
<b>INVESTMENTS</b>				
Investment in road and equipment.....	\$1,007,467,713.46	\$996,741,568.97	\$10,726,144.49	.....
Improvements on leased railway property.....	4,181,212.60	1,416,086.78	2,765,125.82	.....
Sinking funds.....	15,072,997.66	14,597,652.09	475,345.57	.....
Deposits in lieu of mortgaged property sold.....	954.09	935.30	18.79	.....
Miscellaneous physical property.....(a)	32,550,029.13	31,805,766.84	744,262.29	.....
<b>Investments in affiliated companies:</b>				
Stocks.....	276,077,877.61	273,317,127.61	2,760,750.00	.....
Bonds.....	142,891,570.60	134,690,024.70	8,201,545.90	.....
Stocks } Cost inseparable.....	11,917,751.70	12,192,301.70	.....	\$274,550.00
Bonds }				
Notes.....	1,208,529.17	873,654.99	334,874.18	.....
Advances.....	107,990,144.96	107,667,866.75	322,278.21	.....
<b>Other investments:</b>				
Stocks.....	156,710.29	156,710.29	.....	.....
Bonds.....	15,649,902.44	16,282,632.34	.....	632,729.90
Notes.....	2,328,227.78	6,436,716.11	.....	4,108,488.33
Advances.....	381,240.98	434,063.30	.....	52,822.32
Miscellaneous.....	2,115,678.98	1,847,845.29	267,833.69	.....
<b>Total</b> .....	<b>\$1,619,990,541.45</b>	<b>\$1,598,460,953.06</b>	<b>\$21,529,588.39</b>	.....
<b>CURRENT ASSETS</b>				
Cash.....	\$12,281,635.76	\$10,264,657.88	\$2,016,977.88	.....
Special deposits.....	37,876.78	59,287.52	.....	\$21,410.74
Loans and bills receivable.....	194,590.05	3,351,520.52	.....	3,156,930.47
Traffic and car-service balances receivable.....	183,363.95	267,880.32	.....	84,516.37
Miscellaneous accounts receivable.....	3,256,128.77	3,503,017.08	.....	246,888.31
Material and supplies.....(b)	1,555,151.07	1,692,207.19	.....	137,056.12
Interest and dividends receivable.....	2,230,709.00	2,239,583.11	.....	8,874.11
Rents receivable.....	1,221,141.82	1,667,116.12	.....	445,974.30
Other current assets.....	23,726.95	46,824.40	.....	23,097.45
<b>Total</b> .....	<b>\$20,984,324.15</b>	<b>\$23,092,094.14</b>	.....	<b>\$2,107,769.99</b>
<b>ACCOUNTS WITH U. S. GOVERNMENT</b>				
Standard return.....	\$96,489,320.06	\$48,167,342.56	\$48,321,977.50	.....
Less received on account.....	61,625,000.00	16,000,000.00	45,625,000.00	.....
<b>Balance due from U. S. Government.....</b>	<b>\$34,864,320.06</b>	<b>\$32,167,342.56</b>	<b>\$2,696,977.50</b>	.....
Cash and agents' and conductors' balances taken over January 1, 1918, revenues prior to January 1, 1918, and other corporate assets collected, etc.....	37,775,606.19	36,435,380.91	1,340,225.28	.....
Material and supplies, December 31, 1917.....	23,468,531.66	23,581,109.84	.....	\$112,578.18
Depreciation and other reserves.....	8,670,321.83	4,058,073.23	4,612,248.60	.....
Road and equipment retired and not replaced.....	1,257,102.56	431,432.86	825,669.70	.....
<b>Total</b> .....	<b>\$106,035,882.30</b>	<b>\$96,673,339.40</b>	<b>\$9,362,542.90</b>	.....
<b>DEFERRED ASSETS</b>				
Working fund advances.....	\$43,908.18	\$46,928.08	.....	\$3,919.90
Insurance and other funds.....	16,360.00	.....	\$16,360.00	.....
Other deferred assets.....	7,177,875.02	5,493,027.77	1,684,847.25	.....
<b>Total</b> .....	<b>\$4,237,243.20</b>	<b>\$5,539,955.85</b>	<b>\$1,697,287.35</b>	.....
<b>UNADJUSTED DEBITS</b>				
Rents and insurance premiums paid in advance.....	\$90,285.79	\$122,184.72	.....	\$31,898.93
Discount on capital stock.....	3,988,600.00	3,988,600.00	.....	.....
Discount on funded debt.....	3,039,679.78	3,331,811.05	.....	292,131.27
Other unadjusted debits.....	3,581,020.76	5,121,547.86	.....	1,540,527.10
Securities issued or assumed—Unpledged.....(d)	5,924,675.00	(d) 5,849,425.00	(d) 75,250.00	.....
Securities issued or assumed—Pledged.....(d)	156,500.00	(d) 231,750.00	.....	(d) 75,250.00
<b>Total</b> .....	<b>\$10,699,586.33</b>	<b>\$12,564,143.63</b>	.....	<b>\$1,864,557.30</b>
<b>Total assets</b> .....	<b>\$1,764,947,577.43</b>	<b>\$1,736,330,486.08</b>	<b>\$28,617,091.35</b>	.....

(a) The value of the unsold Central Pacific Railway Company and Oregon & California Railroad Company land grant lands is not included in the above statement of assets. (b) Represents material and supplies of California Fuel Oil Department. (d) Excluded from total assets and a corresponding amount excluded from outstanding funded debt in accordance with regulations of Interstate Commerce Commission.

To replace equipment vacated and to provide for increased requirements your company has placed orders with outside concerns for 42 locomotives, 50 passenger-train cars, 750 freight-train cars, and 130 electric cars; and is building at company shops 30 locomotives and 4,065 freight-train cars. Orders have been placed, also, for three ocean-going freight steamers (El Estero, El Isleo, and El Lago) of 7,825 tons displacement, each, and one ocean-going tank steamer (Tamihua) of 22,900 tons displacement. The cost of this new rolling stock and floating equipment will be approximately \$29,700,000, all of which, except the cost of the steamers, it is proposed to provide by means of an equipment trust.

#### THE SUIT INVOLVING THE RIGHT OF THE SOUTHERN PACIFIC COMPANY TO OWN THE STOCK OF THE CENTRAL PACIFIC RAILWAY COMPANY.

On March 9, 1917, the United States District Court at Salt Lake City, composed of three Circuit Judges, decided this suit in favor of the Southern Pacific Company. From this decision the Government took an appeal

to the Supreme Court of the United States. Before the appeal could be fixed for hearing the railroads were taken over by the United States under the Federal Control Act of March 21, 1918. Thereupon the Attorney General applied for and obtained orders of continuance for the purpose of postponing hearing upon the appeal during the period of Federal control. Such control having now ended by the return of the railroads to their owners, it is expected that the appeal will be pressed for hearing. Hence the probabilities are that the case will be argued and submitted early in the October term, 1920.

#### CONTROVERSY ARISING OUT OF THE OREGON AND CALIFORNIA RAILROAD'S LAND GRANT

This is an accounting suit brought in 1917 by the United States seeking to off-set against the compensation of \$2.50 per acre, due the Company for the unsold lands, moneys received by the Company, in excess of \$2.50 per acre, by reason of past sales, leases and otherwise, as well as taxes levied since the forfeiture decision in 1913 and voluntarily paid by the Federal



## BALANCE SHEET

## SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED

LIABILITIES—DECEMBER 31, 1919, COMPARED WITH DECEMBER 31, 1918, EXCLUDING OFFSETTING ACCOUNTS				
LIABILITIES	December 31, 1919	December 31, 1918	Increase	Decrease
<b>STOCK</b>				
Capital stock of Southern Pacific Company.....	\$302,024,905.64	\$276,442,905.64	\$25,582,000.00	.....
Capital stock of Proprietary Companies.....(a)	346,832,400.00	346,832,400.00	.....	.....
Total stock outstanding.....	\$648,857,305.64	\$623,275,305.64	\$25,582,000.00	.....
Premium on capital stock of Southern Pacific Company.....	\$6,304,440.00	.....	6,304,440.00	.....
Total.....	\$655,161,745.64	\$623,275,305.64	\$31,886,440.00	.....
<b>LONG TERM DEBT</b>				
Funded debt unmatured:				
Book liability.....	\$618,169,836.73	\$652,569,674.78	.....	\$34,399,838.05
Less held by or for company.....	6,081,175.00	6,081,175.00	.....	.....
Actually outstanding:				
Southern Pacific Company.....	\$167,608,760.00	\$201,189,710.00	.....	\$33,580,950.00
Proprietary Companies.....(a)	444,479,901.73	445,298,789.78	.....	\$18,888.05
Total funded debt.....	\$612,088,661.73	\$646,488,499.78	.....	\$34,399,838.05
Nonnegotiable debt to affiliated companies:				
Open accounts.....	5,482,434.97	3,227,253.81	\$2,255,176.16	.....
Total.....	\$617,571,096.70	\$649,715,753.59	.....	\$32,144,661.89
<b>CURRENT LIABILITIES</b>				
Loans and bills payable.....	.....	(g) \$6,050,000.00	.....	\$6,050,000.00
Traffic and car-service balances payable.....	\$82,354.41	94,353.40	.....	11,998.99
Audited accounts and wages payable.....	1,134,611.16	1,142,662.12	.....	8,050.96
Miscellaneous accounts payable.....	1,654,735.02	1,517,448.30	\$137,286.72	.....
Interest matured unpaid.....	5,030,633.14	6,296,515.21	.....	1,265,882.07
Dividends matured unpaid.....	4,622,115.76	4,274,988.62	347,127.14	.....
Funded debt matured unpaid.....	62,213.92	127,213.92	.....	65,000.00
Unmatured interest accrued.....	4,813,872.14	5,261,940.89	.....	448,068.75
Unmatured rents accrued.....	288,393.77	247,446.18	40,947.59	.....
Other current liabilities.....	51,492.17	81,287.83	.....	29,795.66
Total.....	\$17,740,421.49	\$25,093,856.47	.....	\$7,353,434.98
<b>ACCOUNTS WITH U. S. GOVERNMENT</b>				
Advances for additions and betterments.....	\$24,592,835.48	\$13,855,161.98	\$10,737,673.50	.....
Advances for expenses prior to January 1, 1918, and other corporate liabilities paid, etc.....	47,811,802.81	45,951,353.23	1,860,449.58	.....
Total.....	\$72,404,638.29	\$59,806,515.21	\$12,598,123.08	.....
<b>DEFERRED LIABILITIES</b>				
Other deferred liabilities.....	\$53,476.61	\$57,331.47	.....	\$3,854.86
<b>UNADJUSTED CREDITS</b>				
Tax liability.....	\$4,166,294.49	\$4,266,757.28	.....	\$100,462.79
Insurance and casualty reserves.....	3,309,723.29	3,264,555.78	\$45,167.51	.....
Accrued depreciation—Road.....(d)	1,322,017.17	1,165,281.37	156,735.80	.....
Accrued depreciation—Equipment.....	51,348,247.38	47,597,739.57	3,750,507.81	.....
Accrued depreciation—Miscellaneous physical property.....(e)	8,541,207.84	7,650,520.81	890,687.03	.....
Other unadjusted credits.....(f)	58,439,936.81	50,639,151.63	7,800,785.18	.....
Total.....	\$127,127,426.98	\$114,584,006.44	\$12,543,420.54	.....
<b>CORPORATE SURPLUS</b>				
Additions to property through income and surplus.....	\$1,404,504.31	\$1,271,691.65	\$132,812.66	.....
Funded debt retired through income and surplus.....	22,302,877.20	21,566,803.76	736,073.44	.....
Sinking fund reserves.....	11,177,796.69	10,337,920.61	839,876.08	.....
Appropriated surplus not specifically invested.....	3,818,177.83	3,818,177.83	.....	.....
Total appropriated surplus.....	\$38,703,356.03	\$36,994,593.85	\$1,708,762.18	.....
Profit and loss—Balance.....	236,185,415.69	226,803,118.41	9,382,297.28	.....
Total corporate surplus.....	\$274,888,771.72	\$263,797,712.26	\$11,091,059.46	.....
Total liabilities.....	\$1,764,947,577.43	\$1,736,330,486.08	\$28,617,091.35	.....

(a) The outstanding capital stock and funded debt include capital stock and funded debt of Proprietary Companies of the par value of \$346,756,300 and \$102,323,216.42, respectively, a total of \$449,079,516.42, which securities are owned by the Southern Pacific Company or by Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the investments shown above. Of the said amount, stocks of the par value of \$249,653,161, which stand charged on the books at \$232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds. (d) Represents accrued depreciation on electric power plants and substations, general office building at San Francisco, wood preserving works, Sacramento rolling mill, oil storage plants, grain elevators, and similar facilities. (e) Represents accrued depreciation on oil lands and improvements acquired from Kern Trading & Oil Company. (f) Represents, principally, interest on construction advances which have not been repaid. (g) Represents notes, issued in connection with the purchase of Liberty Loan Bonds, paid off during the year.

Government to the State of Oregon. The preparation for the trial of this case has involved an extensive examination and comparison of the records of the Company and of the Federal Land Department, local and at Washington. This preparatory work is now about completed and it is believed that the case will be heard in the United States District Court of Oregon some time during 1920.

## THE SUITS INVOLVING TITLE TO THE OIL LANDS

These suits may be divided into two classes—one involving lands alleged by the Government to be valuable oil lands, but not proven or regarded as such by the Southern Pacific Company; and the other involving the Company's productive and valuable oil lands. Both classes of suits have now been disposed of by final judgments of Court, the Government winning the suit for the non-productive oil lands and the Company winning the suits covering its productive and valuable oil lands.

The suit involving non-productive oil lands was known as the Elk Hills Case. It was brought to cancel a patent for 6,109.17 acres which was issued to the Company by the Government in December, 1904, long subsequent to the patents involved in the other suits described in the paragraph below. This case was decided in favor of the Company by the United States Circuit Court of Appeals, but, on November 17, 1919, the Supreme Court of the United States, reversing the Circuit Court of Appeals, directed the entry of a final decree in favor of the United States.

The suits involving our productive and valuable oil lands, six in number and embracing 161,000 acres, were decided in favor of the Company by Judge Bledsoe of the United States District Court for the Southern District of California. The date of this decision and the decree in accordance therewith was August 28, 1919. The law applicable to such cases gave the Government six months within which to appeal. The result of failure to appeal within the time limit is to make the decree final and conclusive. The review of the evidence in the opinion of Judge Bledsoe clearly showed

the absence of any fraud or bad faith in connection with the patents to the lands in question. The decision of the Supreme Court in the Elk Hills Case showed that without clear proof of fraud or bad faith the Government could not win the case. The Attorney General, accordingly, on December 5, 1919, publicly announced that the United States would take no appeal from Judge Bledsoe's decision. Six months have elapsed from the date of the decision and, no appeal having been taken, the decrees in favor of the Company in the six cases are now final and conclusive.

#### TERMINATION OF FEDERAL CONTROL

The Federal Control Act of March 21, 1918, under the terms of which your Company's railroads and steamship lines have been operated by the Federal Government since December 28, 1917, provides, in Section 16, "that this Act is expressly declared to be emergency legislation enacted to meet conditions growing out of war"; and in Section 14, that "the President may relinquish all railroads and systems of transportation under Federal control at any time he shall deem such action needful or desirable." In accordance with these provisions the President of the United States, on December 24, 1919, issued a proclamation relinquishing control of all railroads and steamship lines at 12:01 A.M., March 1, 1920. The terms and conditions under which the properties are returned to their owners are set forth in the Act of Congress, approved February 28, 1920, known as the "Transportation Act, 1920."

Under the terms of the Transportation Act each railroad company is given the option of accepting or refusing a guaranty by the Government to the effect that the Company's railway operating income for the six months' period beginning March 1, 1920, as a whole, in the case of railroads with which a contract has been made fixing the amount of annual compensation under the Federal Control Act, shall be not less than one-half of its annual compensation as fixed in such contract including additional compensation for use of additions and betterments, with the proviso that, in event of the acceptance of such guaranty, if the railway operating income for such guaranty period shall exceed the amount of the guaranty, the Company shall pay such excess to the Government. Your Company accepted this guaranty for itself and all its system lines.

The Transportation Act provides that all transportation rates in effect on February 29, 1920, shall continue in effect until changed by Federal or State authority, and that prior to September 1, 1920 (the end of the guaranty period) no such rate shall be reduced except upon authority of the Interstate Commerce Commission. The Commission is directed to establish rates which will be adequate to provide the railroads as a whole (or as a whole in each of such rate groups or territories as the Commission may designate) with a fair return upon the value, as fixed by the Commission, of the railroad property held for and used in transportation service: *Provided* that during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to 5½ per cent. of such value, but may add thereto a sum equal to one-half of one per cent. of such value to provide for a return upon expenditures for additions and betterments chargeable to capital account. If, however, any railroad, or system of railroads under common control, shall receive for any year a net railway operating income in excess of 6 per cent. of the value of its transportation property one-half of such excess must be placed in a reserve fund to be established by the railroad, and the remaining one-half paid over to the Interstate Commerce Commission to establish a railroad contingent fund. This fund to be used by the Commission either (1) in making loans to railroads to meet expenditures chargeable to capital account or to refund maturing securities originally issued for capital account, or (2) in purchasing transportation equipment and facilities to be leased to the railroads. If for any year the net railway operating income is less than 6 per cent. of the value of the transportation property the reserve fund maintained by the railroad may be drawn upon by it to the extent of such deficit, for the purpose of paying dividends on stock, interest on bonds and other securities, and rent for leased roads, but for no other purpose. This reserve fund is required to be accumulated until it reaches a maximum sum equal to 5 per cent. of the value of the transportation property; and thereafter the portion of its excess income retained by the railroad which is not required to maintain the reserve fund at such maximum sum may be used for any lawful purpose.

In connection with the provisions of the Act limiting the return which a railroad may earn on the value of its transportation property, attention is called to the statement given below showing the per cent. earned by Southern Pacific System on the book value of its transportation property during the years 1909 to 1919, both inclusive, after deducting from Net Railway Operating Income the amounts paid for Miscellaneous Rents and Leased Road Rents:

Year ended June 30 1909, .....	5.11	per cent
" " " " 1910, .....	5.65	" "
" " " " 1911, .....	4.94	" "
" " " " 1912, .....	4.29	" "
" " " " 1913, .....	4.60	" "
" " " " 1914, .....	3.92	" "
" " " " 1915, .....	3.78	" "
" " " " 1916, .....	4.93	" "
" " Dec. 31, 1916, .....	5.25	" "
" " " " 1917, .....	6.24	" "
" " " " 1918, .....	4.60	" "
" " " " 1919, .....	4.48	" "

As stated in last year's report, the officers having immediate supervision of the maintenance and operation of your Company's lines at the time such lines were taken over by the Government, continued, as a rule, as Federal appointees, to supervise the maintenance and operation of your properties under Federal control. Substantially all such officers were elected to their former positions effective with the termination of Federal control.

#### GENERAL

Dividends on the capital stock of your Company were declared during the year, payable as follows:

1½ per cent. paid April 1, 1919.....	\$4,146,646.53
1½ per cent. paid July 1, 1919.....	4,281,716.70
1½ per cent. paid October 1, 1919.....	4,521,853.55
1½ per cent. payable January 2, 1920.....	4,527,908.34

\$17,478,125.12

There has been no material change in the conditions along the line of the Southern Pacific Railroad of Mexico from those reported last year. The average miles of road operated during the year was 1,003 miles, but only such maintenance work was done as was necessary to make possible the operations of trains over those portions of the line open for traffic. The company, during the year, has been unable to make any collection on account of its claims against the Mexican Government. A revised estimate places the cost of property destroyed from the beginning of the Madero Revolution, in 1910, to December 31, 1919, at 4,898,700 pesos, equivalent to \$2,449,350; and the amount due the company for freight and passenger service performed, for rental of road and equipment, and for material furnished to or confiscated by the various military authorities, at 8,947,000 pesos.

In addition to the completed lines of railway reported under Properties and Mileage, and the still incomplete line of the Southern Pacific Railroad Company of Mexico, construction is progressing on the lines of the following companies, viz.:

	Length of Projected Line Miles	Track Completed Miles	Grading Completed Miles	Grading Progressing Miles
SOUTHERN PACIFIC RAILROAD:				
Kern Junction to Silvert, Cal. ....	11.60	† 3.13	8.47	
SOUTHERN PACIFIC COMPANY:				
Sutter Basin Branch— Near Knight's Landing to Tisdale Bypass, Cal.*	19.24	16.49	2.75	
HOUSTON & TEXAS				
CENTRAL RAILROAD:				
Dallas, Texas—Belt Line around city .....	15.54	5.96	—	9.58

\*Line will not be opened to public for traffic until ballasting is completed. †2.58 miles opened to public for traffic August 9, 1919.

With the completion of the 12 miles of the San Diego and Arizona Railway in Carriso Gorge, and the placing in operation, on December 1, 1919, of the last section of the line between Campo and El Centro, Cal., the entire line between San Diego and El Centro was opened to the public for traffic. This line, which is owned jointly by your Company and Messrs. John D. and A. B. Spreckels, will enable your Company to serve San Diego with the shortest line from the middle West.

To provide for the purchase of 4,000 new refrigerator cars, for new icing stations, and for the payment of its existing indebtedness to the parent companies, the Pacific Fruit Express Company, which is owned jointly by your Company and the Union Pacific Railroad Company, and which furnishes refrigerator cars to, and operates icing stations for, the Southern Pacific and Union Pacific Systems, has issued and sold \$25,000,000, par value, seven per cent. equipment trust certificates dated June 1, 1920, and maturing, serially, on June 1st in each year from 1925 to 1935, both inclusive. All such certificates have been guaranteed jointly and severally by the Southern Pacific Company and the Union Pacific Railroad Company.

The status of the accounts of your Company and its Proprietary Companies with the United States Government in connection with the control and operation of your properties, is shown in the balance sheet. The net balance of \$33,631,244.01 due from the Government as shown by these accounts, is made up as follows:

Net amount due from Government account of standard return, cash and agents' and conductors' balances taken over January 1, 1918, and corporate assets collected, after deducting advances for additions and betterments and corporate liabilities, paid, subject to current settlement .....	\$235,287.96
Depreciation and other reserves and road and equipment retirements, not subject to current settlement .....	9,927,424.39
Material and supplies taken over January 1, 1918, for which material and supplies equal in quantity, quality, and relative usefulness are to be returned at end of Federal control .....	23,468,531.66
Total .....	\$33,631,244.01

For the reasons stated in the second paragraph under "Income Account" these accounts do not include any interest due from or to the Government, or the additional compensation due from the Government for use of additions and betterments.

In the annual report for 1917, attention was called to the fact that the physical condition of your Company's property at the time it was taken over by the Government, on January 1, 1918, had reached a higher standard than was ever before attained. As an inspection indicates that the Federal Railroad Administration has not maintained your property, especially the lines in Louisiana and Texas, at this high standard, a special investigation of undermaintenance during Federal control is now being made. Whilst definite figures are not yet available some idea of the extent to which the lines in Louisiana and Texas have been undermaintained during Federal control may be obtained from the following comparison of the average quantities of rail and ties per year used in repairs and renewals on such lines during the two years ended December 31, 1919, with similar averages for the test period, viz.:

	Average per year for the two years ended Dec. 31, 1919	Average per year for the Test period	+Increase —Decrease	Per Cent
New rail .... (Tons)	21,033	23,527	— 2,494	10.60
Ties .....	1,182,419	1,565,183	—382,764	24.45

By order of the Board of Directors,  
JULIUS KRUTTSCHNITT,  
Chairman of the Executive Committee.



## Railway Officers

### Executive

**Edward F. Smith** has been appointed assistant to the president of the Central Vermont, with headquarters at St. Albans, Vermont, effective June 15.

**Francisco Perez**, general superintendent of the National Railways of Mexico, has been appointed director general succeeding **Paulino Fontes**, resigned. Mr. Perez began railroad work as telegraph operator for the Mexican Central, now part of the National Railways of Mexico, in 1900. He became agent of the Aguascalientes division in 1903 and retained that position until 1905 when he was appointed train despatcher. He was promoted to superintendent of the Mexico-Queretaro division in 1907. He became general superintendent in 1914.

### Financial, Legal and Accounting

**Jay V. Hare**, who has been appointed secretary of the Reading Company and the Philadelphia & Reading, with headquarters at the Reading Terminal, Philadelphia, as noted in the *Railway Age* of April 30 (page 1329), served as secretary of the Reading Company and assistant secretary of the Philadelphia & Reading from October, 1912, until his recent appointment on April 21, 1920. Mr. Hare was born on May 24, 1878 at Schodack, Rensselaer County, N. Y. He was educated in the Jamestown (N. Y.) High School and in the New York State University at Albany, N. Y. He began railroad work on September 8, 1897, as junior clerk in the passenger department of the Philadelphia & Reading. He afterwards became clerk in the secretary's department and in January, 1906, was promoted to chief clerk in the same department. He held the latter position until the appointment he received in 1912, which is noted above.

**John J. Ekin**, who has been appointed comptroller of the Baltimore & Ohio, with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 5 (page 737), served as federal auditor of the Baltimore & Ohio, the Western Maryland, the Cumberland Valley and other roads, from July 1, 1918, until the termination of federal control. Mr. Ekin was born on June 8, 1873, at Whitestown, Butler County, Pa. He studied at Ellwood City High School and began railroad work on May 21, 1895, as warehouseman and yard clerk in a local freight office of the Pittsburgh & Western, now part of the Baltimore & Ohio. Afterwards he served until 1895 consecutively as bill clerk, cashier and agent. Then he became rate



J. J. Ekin

and revision clerk in the auditor's office. Having filled other clerical positions in the same department he was appointed general bookkeeper and afterwards chief clerk to the auditor. On March 1, 1902, he was transferred to the service of the Baltimore & Ohio as bookkeeper and general clerk in the office of the auditor of subsidiary lines. While holding that position he was promoted to chief clerk to the auditor. On January 1, 1908, he was appointed auditor and secretary to the board of managers. His next position was superintendent of the relief department of the Washington Terminals. He re-entered the employ of the Baltimore & Ohio in 1913 upon being appointed general accountant.

He then became secretary of the valuation committee. He was promoted to general auditor on July 1, 1915, and retained that position until his appointment as federal auditor.

### Operating

**H. G. McCarthy** has been appointed assistant trainmaster of the Shasta division of the Southern Pacific, with headquarters at Ashland, Ore., effective June 16.

**P. F. Coleman** has been appointed chief supervising agent of the New York Central, lines east of Buffalo, with headquarters at Syracuse, N. Y., effective June 21.

**C. R. Moore**, assistant to the vice-president of the Grand Trunk, with headquarters at Montreal, Que., has been appointed general superintendent of car service, with the same headquarters, effective May 17, succeeding **J. E. Duval**, deceased.

**W. B. Kirkland**, assistant trainmaster on the Stockton division of the Southern Pacific, with headquarters at Tracy, Cal., has been promoted to trainmaster, with the same headquarters, effective June 1. The position of assistant trainmaster of the Stockton division has been abolished.

**J. T. Stanford**, general yardmaster on the Illinois Central, with headquarters at Champaign, Ill., has been promoted to trainmaster of the Chicago, Pontiac and Tracy districts and the Gilman line, of the Illinois division, with headquarters at Chicago, effective June 15. He succeeds **E. H. Baker**, who has been promoted, as noted elsewhere in these columns.

**G. C. Nichols**, superintendent of motor power and equipment of the Alabama, Tennessee and Northern, with headquarters at York, Ala., has been promoted to superintendent, with the same headquarters, effective June 15, and his authority has been extended over the maintenance of way and the transportation departments.

**F. M. Hair**, chief despatcher of the North End Charlotte division of the Southern, with headquarters at Charlotte, N. C., has been appointed trainmaster of the same division, with the same headquarters, succeeding **W. L. King**, promoted; **E. R. Rector**, assistant chief despatcher of the North End Charlotte division, has been appointed chief despatcher, succeeding Mr. Hair, and **J. W. Shelton** has been appointed assistant chief despatcher, succeeding Mr. Rector. These appointments became effective June 15.

**N. P. Thurber**, superintendent of the Kansas City division of the Chicago, Milwaukee & St. Paul, with headquarters at Ottumwa Junction, Iowa, has been transferred to the Chicago & Milwaukee and Northern divisions, with headquarters at Milwaukee, effective June 15. Mr. Thurber succeeds **P. L. Rupp**, who has been granted an extended leave of absence, after forty-three years of continuous service. **B. F. Hoehn**, superintendent of terminals at Milwaukee, Wis., succeeds Mr. Thurber at Ottumwa Junction, Iowa.

**Louis S. Emery**, whose appointment as general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., was announced in the *Railway Age* of June 18 (page 1958), was born at Adrian, Mich., on December 30, 1878. Mr. Emery entered railway service as a clerk in one of the local freight offices at Youngstown, O., in August, 1897. From 1898 to 1899 he served as a yard clerk on the New York Central with headquarters at Toledo, O. During the next three years he was a clerk in the ticket office, with the same headquarters. In 1902, he served in the signal department, with headquarters at New York City and a year later was appointed superintendent of the Marcellis & Otisco Lake with headquarters at Marcellis, N. Y. He was appointed yardmaster for the New York Central at Auburn, N. Y., in 1905, and after one year of service was promoted to trainmaster. In 1911, he was promoted to assistant superintendent with headquarters at Syracuse, N. Y. After a service of two months during the latter part of 1907 as superintendent of the Oswego & Watertown, a subsidiary of the New York Central, he was promoted to superintendent on the New York Central with headquarters at Buffalo, N. Y., the position he held at the time of his appointment as general manager of the Lake Erie & Western.

**Olin B. Castle**, who served as superintendent of car service on the Southern Pacific, Louisiana and Texas lines, with headquarters at Houston, Tex., prior to federal control, has been appointed assistant superintendent of transportation, with headquarters at Houston, effective June 1. The position of superintendent of car service was abolished on this date. Mr. Castle was born at Brownsville, Pa., on January 22, 1874, and entered railway service in 1892 as a messenger in the telegraph department of the Pennsylvania Lines at Dennison, Ohio. He was promoted to operator in 1893, and filled various positions in the telegraph service on the Pittsburgh division until 1900. In October,



O. C. Castle

1900, he entered the service of the Baltimore & Ohio at Baltimore, Md., where he was given charge of mileage accounts and statistics in the office of the superintendent of car service. He was later promoted to assistant chief clerk of the department. In March, 1902, he was transferred to the general manager's office and in June, 1903, he was appointed chief clerk to the superintendent of the Butler division. He went to Chicago in May, 1907, with Arthur Hale, agent of the American Railway Association, and assisted in the organization of the American Railway clearing house and the committee on car efficiency of the American Railway Association. He worked with the Commission on the interchange of freight cars, in making a scientific study of the value of freight cars, resulting in the adoption, in 1910, of the 30 and 35-cent variable per diem rate. He was appointed car service agent on the Central System of the Southern Pacific on August 15, 1911, and in 1917 was promoted to superintendent of car service. During federal control Mr. Castle was furloughed for service with the United States Railroad Administration, and from January, 1918, to January, 1919, served as special assistant, Car Service Section, at Washington, D. C., and from January, 1919, to March 1, 1920, as staff officer of transportation to the regional director of the Southern region. From March 1 to June 1, 1920, he served as a special assistant on the Commission of Car Service of the American Railroad Association, with headquarters at Washington, which position he held at the time of his appointment as noted above.

### Traffic

**Ira W. Morris** has been appointed assistant general freight agent of the Hocking Valley, with headquarters at Columbus, Ohio, effective July 1.

**E. L. Carey**, has been appointed general agent of the passenger department of the Northern Pacific, with headquarters at Seattle, Wash., effective June 21.

**L. B. Smith**, foreign freight agent of the Southern, with headquarters at New Orleans, La., has been appointed assistant general freight agent, with headquarters at Charleston, S. C., effective May 20.

### Engineering, Maintenance of Way and Signaling

**Walter J. Towne**, engineer of maintenance of the Chicago & Northwestern, with headquarters at Chicago, has been promoted to chief engineer with the same headquarters, succeeding **L. J. Putnam**, deceased. A sketch of Mr. Towne's career appeared in the issue of the *Railway Age* for March 5 (page 737).

**Frank C. Huffman**, principal assistant engineer on the Chicago & Northwestern, with headquarters at Chicago, has been appointed assistant engineer of maintenance of lines east of the Missouri river, with the same headquarters, effective June 1. He succeeds **D. C. Rounesville**.

**L. H. Bond**, whose promotion to district engineer of the Northern lines of the Illinois Central, with headquarters at Chicago, was announced in the *Railway Age* of June 4 (page 1592), was born on November 14, 1879, at Louisville, Ky. Mr. Bond was educated at Du Pont Technical College, completing his work there in 1899. He entered railway service on Sept. 30, 1899, as a chainman with the Illinois Central. During the next five years he served successively as chainman, rodman, masonry inspector and instrument man. In 1904, he was appointed assistant engineer at Vicksburg, Miss. From 1905 to 1907, he served as supervisor on the St. Louis division, and upon the latter date was promoted to assistant engineer on this division, which position he held until 1910, when he was appointed roadmaster of the Springfield division. From 1914 to 1917, he served as roadmaster of the St. Louis division. In 1917 he became assistant engineer of maintenance of way, and in June, 1919, he was appointed assistant engineer of the Illinois Central Company (corporate), which position he held at the time of his promotion on May 20.

**J. V. Neubert**, engineer of track of the New York Central, Lines East of Buffalo, exterior zone, with headquarters at New York, has been promoted to engineer maintenance of way of the same zone and region, with the same headquarters, succeeding **G. W. Vaughan**, deceased. Mr. Neubert was born at Kittanning, Pa., and graduated from the Pennsylvania State College in 1899. He entered the employ of the New York Central on July 3 of that year as a clerk, being transferred six weeks later as a chainman to the engineering department. He subsequently served as a rodman and as an inspector in that department, until September 1, 1900, when he was promoted



J. V. Neubert

to assistant supervisor of track. On May 1, 1902, he was promoted supervisor of track, serving in that position until January 1, 1903, when he was promoted to assistant engineer in a division engineer's office, being transferred in 1904 to the office of the engineer maintenance of way. On April 1, 1907, he was promoted to division engineer, with headquarters at Albany, N. Y., where he remained until April, 1909, when he was promoted to engineer of track of the Lines East of Buffalo, exterior zone, continuing in that capacity until his recent promotion as noted above.

### Special

**E. H. Baker**, trainmaster on the Illinois division of the Illinois Central, with headquarters at Champaign, Ill., has been promoted to the newly created position of supervisor of passenger service employees, with headquarters at Chicago, effective June 15. He will have jurisdiction over all station and passenger train employees.

### Obituary

**R. Marpole**, executive agent of the Canadian Pacific, with headquarters at Vancouver, B. C., died in Vancouver on June 8.



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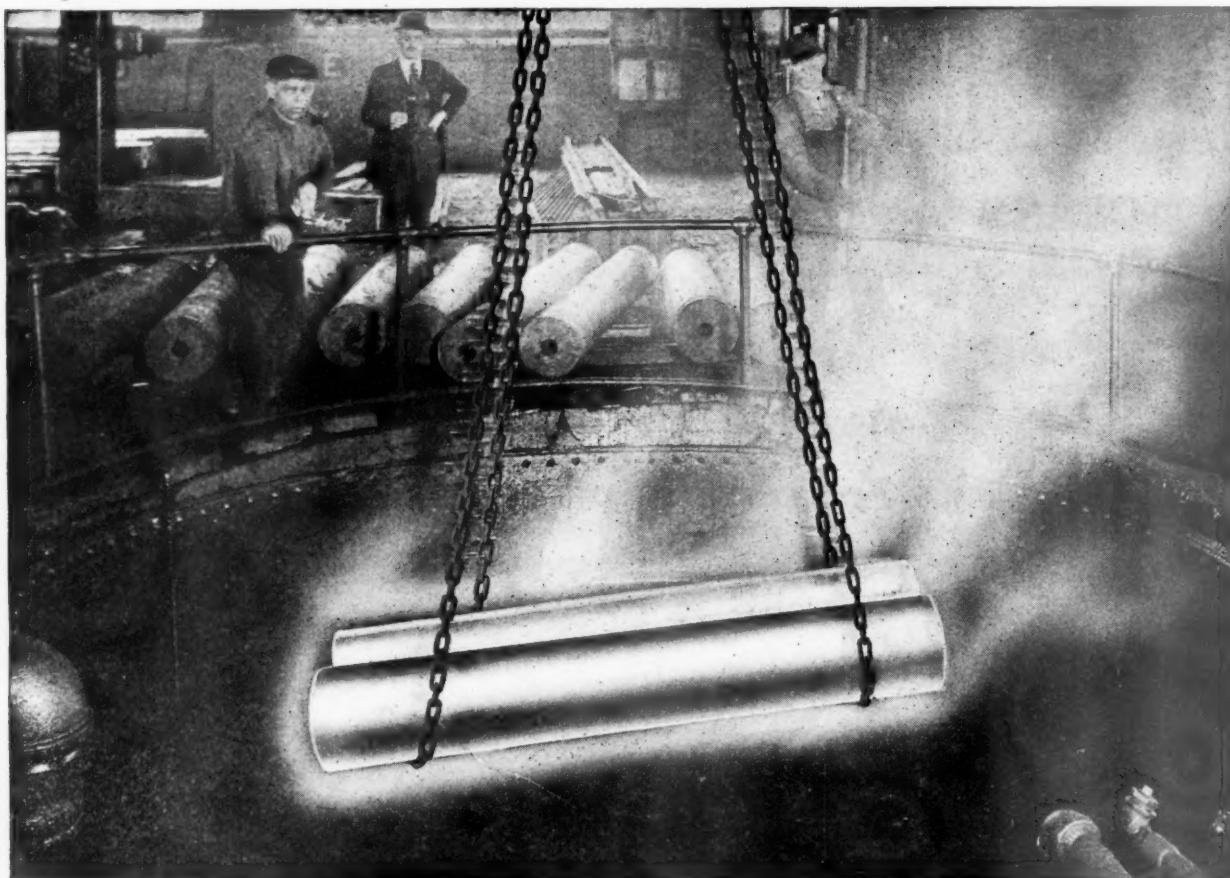
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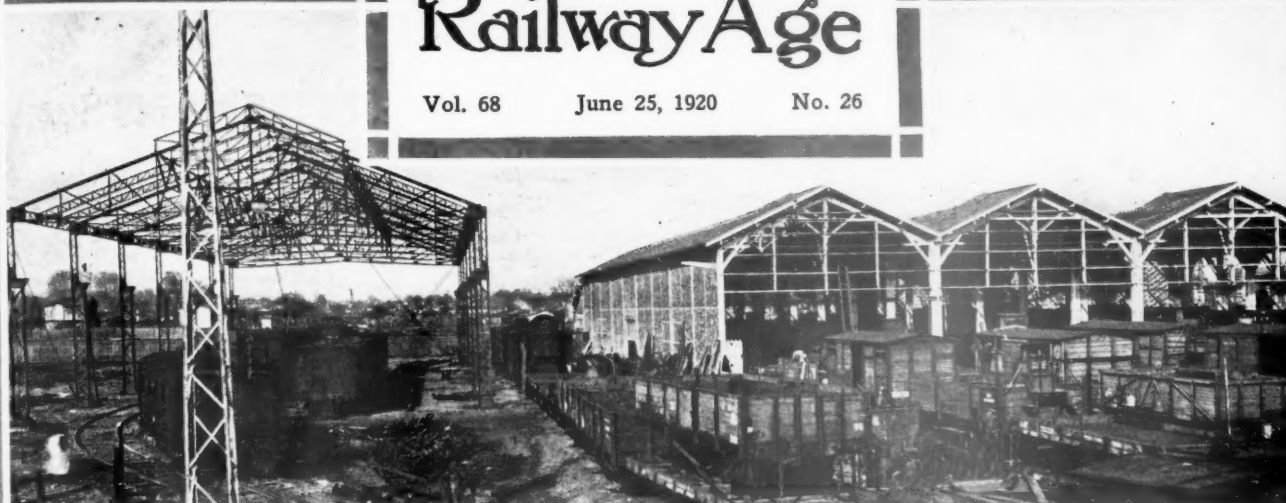
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# Railway Age

Vol. 68 June 25, 1920 No. 26



A Railway Car Repair Shop in France. Photo from Keystone View Company

## Contents

### New Electric Motor Cars for the Long Island .....Page 1964

An Article by S. B. Schenck, Describing the Electrical Equipment, etc., of 70 New Cars Ordered Recently, and Pointing Out that Very Few Changes Have Been Made for Purpose of Perfecting Equipment Built 15 Years Ago.

### The American Society for Testing Materials ..... 1969

Reporting Such Parts of the Convention of This Organization at Asbury Park, N. J., as Are of Interest to Railway Men.

### Hearing in General Rate Advance Case ..... 1977

Testimony as to Individual Commodities Principally Confined to Question of Percentage or Specific Advance.

#### EDITORIALS

Economics of Engine Terminals .....	1959
Once More the "Practical" and Theoretical .....	1959
White for Clear Is a Dangerous Color .....	1959
Short Lines and the Revolving Fund .....	1959
It Is Time to Make a Change .....	1960
The High Cost of Railroadng .....	1960
The Railways Must Work Together Better .....	1961
Southern Pacific .....	1962

#### NEW BOOKS ..... 1963

#### GENERAL ARTICLES

New Electric Motor Cars for the Long Island; S. B. Schenck..	1964
Transportation in Bolshevik Russia in 1920; Gregory Alexinsky	1966

#### GENERAL ARTICLES—Continued

Priority for Coal Shipments .....	1967
The American Society for Testing Materials .....	1969
B. & O. Passing Report .....	1973
An Engine House for Mallet Compound Locomotives .....	1975
Prussian-Hessian Railways Financial Position; Robert E. Thayer .....	1976
Hearing in General Rate Advance Case .....	1977
Train Accidents in March .....	1982
Operations of Supply Trains on Southern Pacific .....	1983
Fuel Stations .....	1984
Using a Ballast Spreader to Remove Ice from Tracks .....	1986

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WE GUARANTEE, that of this issue, 10,165 copies were printed; that of these 10,165 copies, 9,194 were mailed to regular paid subscribers, 72 were provided for counter and news company sales, 465 were mailed to advertisers, 81 were mailed to employees and correspondents and 353 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 266,165, an average of 10,237 copies a week.

# ALPHABETICAL INDEX TO ADVERTISEMENTS

<b>A</b>		Directory of Engineers.....	86	Kerite Insulated Wire & Cable	71	Railway & Industrial Engineers,	86
Air Reduction Co., Inc.....	76	Dixon Crucible Co., Joseph.....	82	Co.....	71	Inc.....	65
Ajax Metal Co.....	79	Duncan Lumber Co.....	94	Keyoke Ry. Equipment Co....	86	Ramapo Iron Works.....	94
Allen & Son, A.....	70	Duner Co.....	80	Kinnear & Co., W. S.....	90	Robinson Connector Co., The.	33
American Arch Co.....	1, 46	<b>E</b>		Kinnear Mfg. Co.....	86	Robinson Co., Dwight P.....	86
Am. Brake Shoe & Fdy. Co....	81	Edgewater Steel Co.....	63	<b>L</b>		Rogers Co., H. A.....	70
American Bridge Co.....	101	Edison Storage Battery Co....	11	Lehon Co., The.....	80	Rome Iron Mills, Inc.....	48
American Chain Co.....	2	Elwell-Parker Electric Co., The	80	Lillie Co., Dexter P.....	78	<b>S</b>	
American Hardwood Manufac-		<b>F</b>		Lima Locomotive Works, Inc.	50	Safety Car Heating & Lighting	
turers' Association.....	96	Fairbanks, Morse & Co.....	28	Link Belt Co.....	101	Co., The.....	36
American Locomotive Co.....	51	Fairmont Gas Engine & Rail-		Locomotive Feed Water Heater	49	Schaefer Equipment Co.....	76
American Malleable Castings		way Motor Car Co.....	73	Co.....	56	Scullin Steel Co.....	31
Association.....	40	Falls Hollow Staybolt Co.....	81	Locomotive Stoker Co.....	50A	Sellers & Co., Inc., Wm.....	71
Am. Mason Safety Tread Co.	80	Federal Cement Tile Co.....	86	Locomotive Superheater Co...	86	Smith & Co., C. E.....	86
American Sheet & Tin Plate		Ferguson Furnace Co.....	77	Lovell, Alfred.....	54	Southern Iron & Equipment Co.	84
Co.....	90	Flannery Bolt Co.....	61	Lukens Steel Co.....		Standard Car Truck Co.....	81
American Steel & Wire Co.....	94	For Sale & Want Advertise-		<b>M</b>		Standard Coupler Co.....	80
American Steel Foundries.....	39	ments.....	83, 84, 85	Males Co.....	85	*Standards Forgings Co.....	21
Armco Culvert & Flume Mfrs.		Fort Pitt Malleable Iron Co.....	79	Manganese Steel Rail Co.....	94	Standard Steel Works Co.....	41
Assn.....	93	Fort Pitt Spring & Mfg. Co....	80	Magnus Co., Inc.....	79	Star Brass Mfg. Co.....	82
Arnold Co., The.....	86	Fowler, Charles Evan.....	86	Manning, Maxwell & Moore,	9	*Stark Rolling Mill.....	98
Ashton Valve Co., The.....	80	Fowler, George L.....	86	Inc.....	75	Stone, Franklin Co.....	38
Austin Co., The.....	88, 89	Frank, M. K.....	85	McConway & Torley Co., The	90	Stone & Webster.....	86
<b>B</b>		Franklin Railway Supply Co.,	44, 45, 47	Mead-Morrison Mfg. Co.....	13	Stueki Co., A.....	79
Baldwin Locomotive Wks., The	53	Fuller-Lehigh Co.....	82	Midvale Steel & Ordnance Co.	19	Symington Co., T. H., The....	7
Ball Engine Co.....	94	<b>G</b>		Miller Train Control Corp....	3	<b>T</b>	
Barco Mfg. Co.....	55	Galena Signal Oil Co.....	67	Miner, W. H.....	78	Texas Co., The.....	62
Basford Co., G. M.....	43	General American Car Corp....	32	Mohawk Lubricating Co.....	97	<b>U</b>	
Bethlehem Steel Co.....	91	General Electric Co.....	102	Morgan Engineering Co.....	38	Union Draft Gear Co.....	75
Blaw-Knox Co.....	101	Get-Together Dept.....	83, 84, 85	Mount Vernon Car Mfg. Co..	36	Union Refrigerator Transit Co.	84
Boston & Lockport Block Co.	76	Gibson-Prible Co.....	78	Mudge & Co.....	25	Union Spring & Mfg. Co.....	36
Bronze Metal Co.....	79	Giessel Co., Henry.....	76	Murphy Varnish Co.....		U. S. Cast Iron Pipe & Fdy.	82
Brooks-Scanlon Co.....	80	Gould Coupler Co.....	75	<b>N</b>		Co.....	82
Brosius, Edgar E.....	101	Graver Corporation.....	76	National Malleable Castings Co.,	79	U. S. Light & Heat Corp....	36
Brown Hoisting Machine Co.,		Gray & Sons, Inc.....	85	The.....	81	U. S. Metallic Packing Co., The	60
The.....	100	Greenville Steel Car Co.....	36	National Railway Appliance Co.	80	<b>V</b>	
Browning Co., The.....	95	Gulick-Henderson Co.....	86	Nichols & Bros., Geo. P.....	72	Vapor Car Heating Co., Inc..	36
Buckeye Jack Mfg. Co.....	77	<b>H</b>		Niles-Bement-Pond Co.....	86	<b>W</b>	
Buckeye Steel Castings Co....	76	Haskell & Barker Car Co., Inc.	35	Northern Engineering Works.	68	Walworth Mfg. Co.....	80
Bucyrus Co.....	101	Hayward Co., The.....	82	Norton, Inc., A. O.....		Want & For Sale Advt. 83, 84,	85
Buda Co., The.....	26	Heywood Bros. & Wakefield Co.	82	<b>O</b>		Watson Engineering Co., The.	86
Buffalo Forge Co.....	29, 74	Hunt Co., Robert W.....	86	Ohio Locomotive Crane Co....	90	Western Ry. Equipment Co....	81
Burden Iron Co., The.....	82	Hunt-Spiller Mfg. Corp.....	52	Okonite Co., The.....	9	Western Wheeled Scraper Co.	78
Bush, Roberts & Schaefer.....	86	Hutchins Car Roofing Co.....	42	Orton & Steinbrenner.....	101	Westinghouse Air Brake Co..	57
<b>C</b>		Hyatt Roller Bearing Co.....	22, 23	<b>P</b>		Westinghouse Electric & Mfg.	
Cambria Steel Co.....	13	Hyman-Michaels Co.....	84	P. & M. Co., The.....	70	Co.....	34
Camel Co.....	38	<b>I</b>		Parkesburg Iron Co., The....	58	Wharton, Jr., & Co., Inc., Wm.	81
Canton Fdy. & Machine Co..	37	Independent Pneumatic Tool		Pilliod Co., The.....	59	White Engineering Corp., The	86
Carnegie Steel Co.....	91	Co.....	76	Pittsburgh-Des Moines Steel Co.	80	J. G.....	86
Chase & Co., L. C.....	36	Individual Drinking Cup Co.,		Pittsburgh Forge & Iron Co.	68	Whiting Fdy. & Equipment Co.	30
Chicago-Cleveland Car Roofing		Inc.....	27	Pittsburgh Spring & Steel Co.	78	Wilson & Co., E. H.....	85
Co.....	77	Industrial Works.....	99	Pittsburgh Testing Laboratory.	86	Wilson Corp., The J. G.....	86
Chicago Pneumatic Tool Co....	15	Ingersoll-Rand Co.....	17, 74	Pollak Steel Co., The.....	4	Wine Ry. Appliance Co., The.	79
Chicago Railway Equipment Co.	37	Interstate Iron & Steel Co....	80	Power Specialty Co.....	36	Woods & Co., Edwin S.....	79
Clapp, Norstrom & Riley.....	87	Iron City Products Co.....	73	Pratt & Lambert, Inc.....	92	Worthington Pump & Machin-	
Classified Advertisements.....	83	<b>J</b>		Pressed Steel Car Co.....	38	ery Corp.....	60
Cleveland Frog & Crossing Co.	81	Jennison-Wright Co., The....	24	Pyle-National Company, The..	64	<b>Y</b>	
Columbia Nut & Bolt Co.....	80	Johns-Manville Co., H. W.....	72	<b>Q</b>		Young, C. C.....	82
Copper Clad Steel Co.....	82	Johnson & Co., J. R.....	77	Q & C Packing & Lubricator		Youngstown Steel Car Co....	77
Crane Co.....	78	Jointless Firebrick Co.....	94	Co., The.....	69	<b>Z</b>	
Crosby Steam Gage & Valve Co.	76	<b>K</b>		<b>R</b>		Zelnicker Supply Co.....	84
<b>D</b>		Kaustine Co., Inc.....	72	Railroad Supply Co., The....	80		
Damascus Brake Beam Co., The	80	Keith, Herbert C.....	86	Railway Devices Co., The....	81		
Damascus Bronze Co.....	79	Keith Railway Equipment Co.	85				
Dearborn Chemical Co.....	75	Keller Pneumatic Tool Co....	82				
De Vilbiss Mfg. Co., The.....	94	<b>L</b>					
Dickinson, Inc., Paul.....	80	Lehon Co., The.....	80				
Directory of Advertisers, Classi-		Lillie Co., Dexter P.....	78				
fied.....	8, 10, 12, 14, 16, 18	Lima Locomotive Works, Inc.	50				

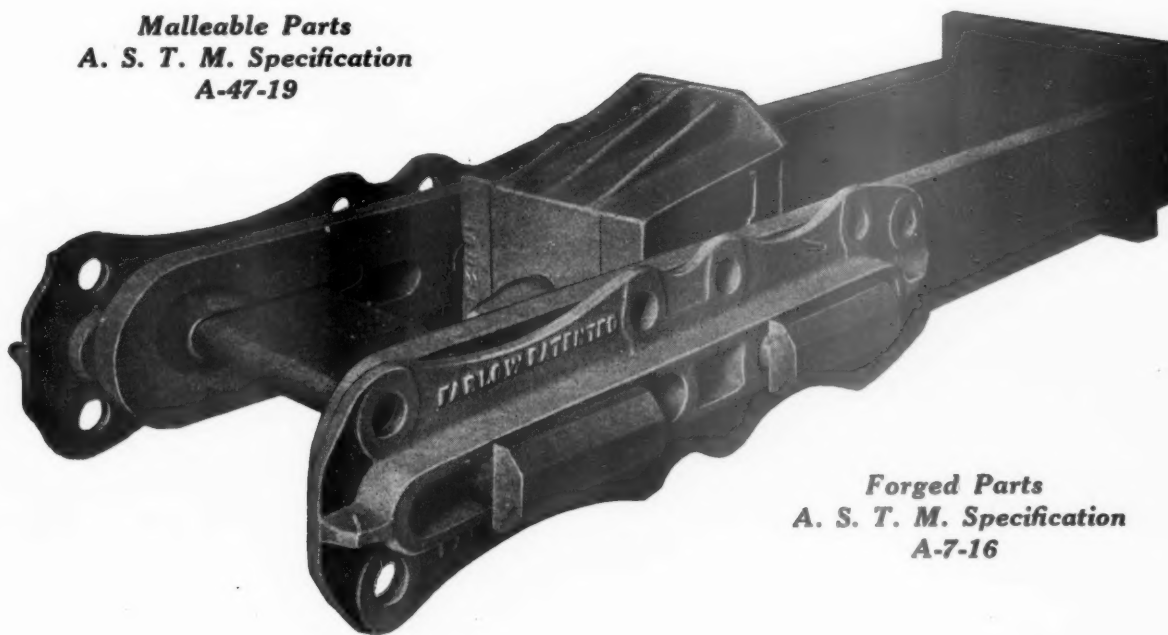


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# DIRECTORY OF ADVERTISERS, CLASSIFIED—ALPHABETICAL INDEX, PAGE 6

<b>ACETYLENE, DISSOLVED.</b> Air Reduction Co., Inc. <b>ADJUSTABLE RAIL CLAMPS.</b> Q & C Co. <b>AERIAL TRAMWAYS.</b> American Steel & Wire Co. <b>AIR HAMMERS.</b> Keller Pneumatic Tool Co. <b>AIR INJECTORS.</b> Chicago Pneumatic Tool Co. Keller Pneumatic Tool Co. <b>ANGLE BARS.</b> Bethlehem Steel Co. Cambria Steel Co. Carnegie Steel Co. Q & C Co. <b>APPARATUS, BRAZING, WELDING AND CUTTING HEAT TREATMENT.</b> Air Reduction Co., Inc. <b>ARCHES, LOCOMOTIVE FIRE-BOX.</b> American Arch Co. <b>ARC WELDERS.</b> National Ry. Appliance Co. <b>ARRESTERS, LIGHTNING.</b> General Electric Co. P. & M. Co., The. <b>ASBESTOS.</b> H. W. Johns-Manville Co. <b>AUTOMATIC SPEED CONTROL DEVICES.</b> Miller Train Control Corporation. <b>AUTOMATIC CAB SIGNALS.</b> Miller Train Control Corporation. <b>AXLES.</b> American Locomotive Co. Cambria Steel Co. Carnegie Steel Co. Johnson & Co., J. E. Lima Locomotive Works, Inc. Pittsburgh Forge & Iron Co. Pollak Steel Co. Standard Forgings Co. Standard Steel Works Co. <b>BABBITT METAL.</b> Ajax Metal Co. Allen & Son, A. Bronze Metal Co. Damascus Bronze Co. <b>BALL JOINTS.</b> Franklin Ry. Supply Co., Inc. <b>BARB WIRE.</b> American Steel & Wire Co. <b>BARGES.</b> American Bridge Co. <b>BARGES AND HULLS.</b> Pittsburgh-Des Moines Steel Co. <b>BARS, ANGLE AND SPLICE.</b> Bethlehem Steel Co. Cambria Steel Co. Carnegie Steel Co. <b>BARS, IRON AND STEEL.</b> Bethlehem Steel Co. Cambria Steel Co. Carnegie Steel Co. Falls Hollow Staybolt Co. Pollak Steel Co. <b>BARS, FOR REINFORCED CONCRETE.</b> Interstate Iron & Steel Co. Pollak Steel Co. <b>BATTERIES, ELECTRIC.</b> Edison Storage Battery Co. Railroad Supply Co. U. S. Light & Heat Corp. <b>BATTERIES, SIGNAL.</b> Electric Storage Battery Co. U. S. Light & Heat Corp. <b>BATTERIES, STORAGE.</b> Edison Storage Battery Co. Stone Franklin Co. U. S. Light & Heat Corp. <b>BATTERY CHUTES AND VAULTS.</b> Railroad Supply Co. <b>BEARINGS.</b> Haskell & Barker Car Co., Inc. <b>BEARINGS, CENTER.</b> Miner, W. H. Swington Co., T. H. Woods & Co., Edwin S. <b>BEARINGS (HAND CAR, INSPECTION CAR, PUSH CAR, MOTOR CAR AND SECTION CAR).</b> Hyatt Roller Bearing Co. <b>BEARINGS, JOURNAL.</b> Ajax Metal Co. Allen & Son, A. Bronze Metal Co. Damascus Bronze Co. Magnus Co. <b>BEARINGS, ROLLER.</b> Hyatt Roller Bearing Co. <b>BEARINGS, SIDE.</b> American Steel Foundries. Chicago Ry. Equipment Co. Fort Pitt Malleable Iron Co. Miner, W. H. Woods & Co., Edwin S. <b>BEARINGS, SIDE (ROLLER) (FRICTIONLESS).</b> Chicago Ry. Equipment Co. Miner, W. H. Wine Railway Appliance Co., The. Woods & Co., Edwin S. <b>BELL RINGERS.</b> Railway Devices Co. U. S. Metallic Packing Co. Western Railway Equipment Co. <b>BELLS, LOCOMOTIVE.</b> American Locomotive Co. <b>BENDING ROLLS.</b> Sellers & Co., Inc., Wm. <b>BLOW PIPES, OXY-ACETYLENE.</b> Air Reduction Co. <b>BLOWER SETS.</b> General Electric Co. <b>BLOWERS.</b> General Electric Co. <b>BOLTS AND NUTS.</b> Bethlehem Steel Co. National Malleable Castings Co. <b>BOILER CHEMICALS.</b> Dearborn Chemical Co. <b>BOILER COMPOUNDS.</b> Dearborn Chemical Co. <b>BOILER GRAPHITE.</b> Dixon Crucible Co., Joseph. <b>BOILER TESTERS.</b> Sellers & Co., Inc., Wm. <b>BOILERS, LOCOMOTIVE.</b> American Locomotive Co. Baldwin Locomotive Works, The. Lima Locomotive Works. <b>BOLSTERS, STEEL.</b> American Steel Foundries. Buckeye Steel Castings Co. Gould Coupler Co. Haskell & Barker Car Co., Inc. Pressed Steel Car Co. <b>BOLTS AND NUTS.</b> Bethlehem Steel Co. Cambria Steel Co. Carnegie Steel Co. National Malleable Castings Co. <b>BOLTS, PATCH.</b> Falls Hollow Staybolt Co. <b>BOOKS.</b> Gibson Pribble Co. <b>BORING AND TURNING MILLS.</b> Sellers & Co., Inc., Wm. <b>BORING MACHINES, HORIZONTAL.</b> Sellers & Co., Inc., Wm. <b>BRAKES, HAND (FREIGHT CAR).</b> Wine Railway Appliance Co. <b>BRAKE BEAM SUPPORTS.</b> American Steel Foundries. Chicago Ry. Equipment Co. Haskell & Barker Car Co., Inc. <b>BRAKE BEAMS.</b> American Steel Foundries. Chicago Ry. Equipment Co. Damascus Brake Beam Co. Haskell & Barker Car Co., Inc. Joliet Railway Supply Co. Pressed Steel Car Co. <b>BRAKE BLOCKS.</b> H. W. Johns-Manville Co. <b>BRAKE FORGINGS.</b> American Steel Foundries. <b>BRAKE FORGINGS, JAWS, LEVERS, ETC.</b> Haskell & Barker Car Co., Inc. <b>American Steel Foundries.</b> National Railway Appliance Co. Railway Devices Co. Western Railway Equipment Co. <b>BRAKE HEADS.</b> American Steel Foundries. Chicago Ry. Equipment Co. Nat'l Malleable Castings Co. <b>BRAKE JAWS.</b> National Ry. 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# DIRECTORY OF ADVERTISERS, CLASSIFIED—ALPHABETICAL INDEX, PAGE 6

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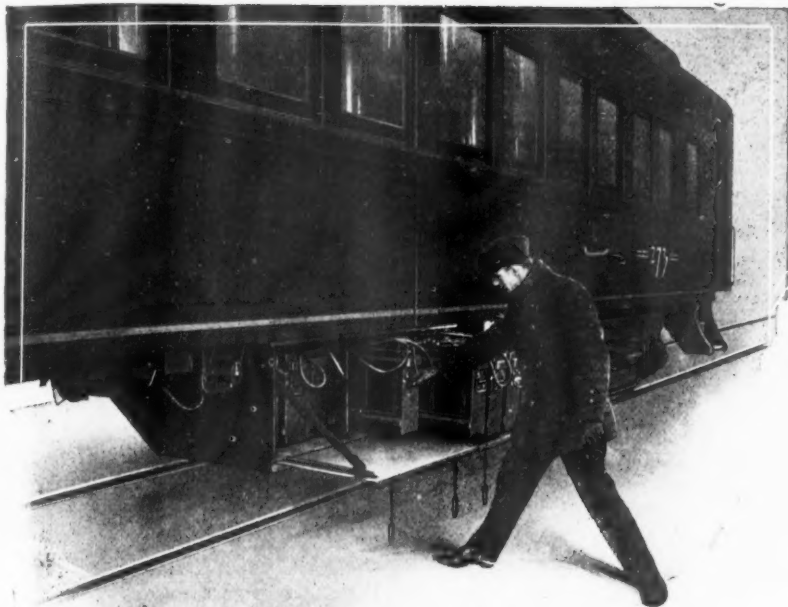
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# DIRECTORY OF ADVERTISERS, CLASSIFIED—ALPHABETICAL INDEX, PAGE 6

<b>DRAWBAR YOKES.</b> Miner, W. H.	<b>ENGINES, CRUDE, FUEL OIL.</b> Chicago Pneumatic Tool Co.	<b>FORMS, STEEL; CONCRETE CONSTRUCTION.</b> Blaw-Knox Co.	<b>GLOBE VALVES.</b> Crane Company.
<b>DREDGES.</b> Pittsburgh-Des Moines Steel Co.	<b>ENGINES, GAS AND GASOLINE.</b> Buda Company. Chicago Pneumatic Tool Co.	<b>FOUNDRIY EQUIPMENT.</b> Whiting Foundry Equipment Co.	<b>GRADING MACHINERY.</b> Ball Engine Co.
<b>DREDGING MACHINERY.</b> Ball Engine Co. Bucyrus Co. Industrial Works.	<b>ENGINES, STANDARD CAR.</b> Mudge & Co.	<b>FRAMES, LOCOMOTIVE.</b> American Locomotive Co.	<b>GRAPHITE PAINT.</b> Dixon Crucible Co., Joseph.
<b>DRILLS.</b> Keller Pneumatic Tool Co.	<b>ENGINES, HOISTING.</b> Brown Holsting Machinery Co. Bucyrus Co. Industrial Works.	<b>FRAMES, TRUCK.</b> American Locomotive Co. American Steel Foundries. Franklin Ry. Supply Co., Inc. Pressed Steel Car Co.	<b>GRAPHITE LUBRICANT.</b> Dixon Crucible Co., Jos. Galena-Signal Oil Co.
<b>DRILLS, AIR.</b> Chicago Pneumatic Tool Co. Keller Pneumatic Tool Co. Ingersoll-Rand Co.	<b>EXCAVATING MACHINERY.</b> Ball Engine Co.	<b>FRAMES, VANADIUM.</b> American Locomotive Co.	<b>GRATE SHAKERS.</b> Franklin Ry. Supply Co., Inc.
<b>DRILLS, ELECTRIC.</b> Chicago Pneumatic Tool Co.	<b>EXCAVATORS.</b> Ball Engine Co.	<b>FREIGHT HOUSE DOORS—(SEE DOORS, FOLDING, AND DOORS, ROLLING).</b>	<b>GREASE.</b> Dixon Crucible Co., Joseph.
<b>DRILLS, ROCK.</b> Ingersoll-Rand Co.	<b>EXPANDER RINGS.</b> H. W. Johns-Manville Co.	<b>FREIGHT TERMINALS.</b> Austin Co.	<b>GREASE MACHINES.</b> Franklin Ry. Supply Co., Inc.
<b>DRILLS, TRACK AND BONDING.</b> Buda Company. Ingersoll-Rand Co.	<b>FACTORY BUILDINGS.</b> Austin Co.	<b>FRICTION BUFFERS.</b> Miner, W. H.	<b>GRINDERS, PORTABLE, ELECTRIC.</b> Buda Company. Chicago Pneumatic Tool Co.
<b>DRINKING CUPS, PAPER.</b> Individual Drinking Cup Co., Inc.	<b>FANS, EXHAUST AND VENTILATING.</b> General Electric Co. Mudge & Co. Westinghouse Elec. & Mfg. Co.	<b>FROGS.</b> Bethlehem Steel Co.	<b>GRINDING MACHINES.</b> Independent Pneumatic Tool Co. Sellers & Co., Inc., Wm.
<b>DRINKING FOUNTAINS.</b> Glesel Co., Henry Individual Drinking Cup Co.	<b>FASTENERS, CAR DOOR.</b> Fort Pitt Malleable Iron Co. Miner, W. H. National Malleable Castings Co.	<b>FROGS AND CROSSINGS.</b> Buda Company. Cleveland Frog & Crossing Co. P. & M. Co., The. Ramapo Iron Works.	<b>GRINDING TOOLS, PORTABLE.</b> Independent Pneumatic Tool Co. Ingersoll-Rand Co.
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<b>DUST GUARDS.</b> Gould Compler Co. Railway Devices Co. Wilmington Co., T. H. Western Railway Equipment Co.	<b>FILTERS (PRESSURE AND GRAVITY).</b> Graver Corp.	<b>FURNACES, ANNEALING.</b> Ferguson Furnace Co. Whiting Fdry. Equipment Co.	<b>GUY WIRES.</b> Page Steel & Wire Co.
<b>DYNAMOS.</b> General Electric Co. Stone Franklin Co. Westinghouse Elec. & Mfg. Co. Western Electric Co.	<b>FILTERS (WATER).</b> Graver Corporation.	<b>FURNACES, BILLET HEATING.</b> Ferguson Furnace Co.	<b>HAMMERS, PNEUMATIC—(SEE PNEUMATIC TOOLS).</b>
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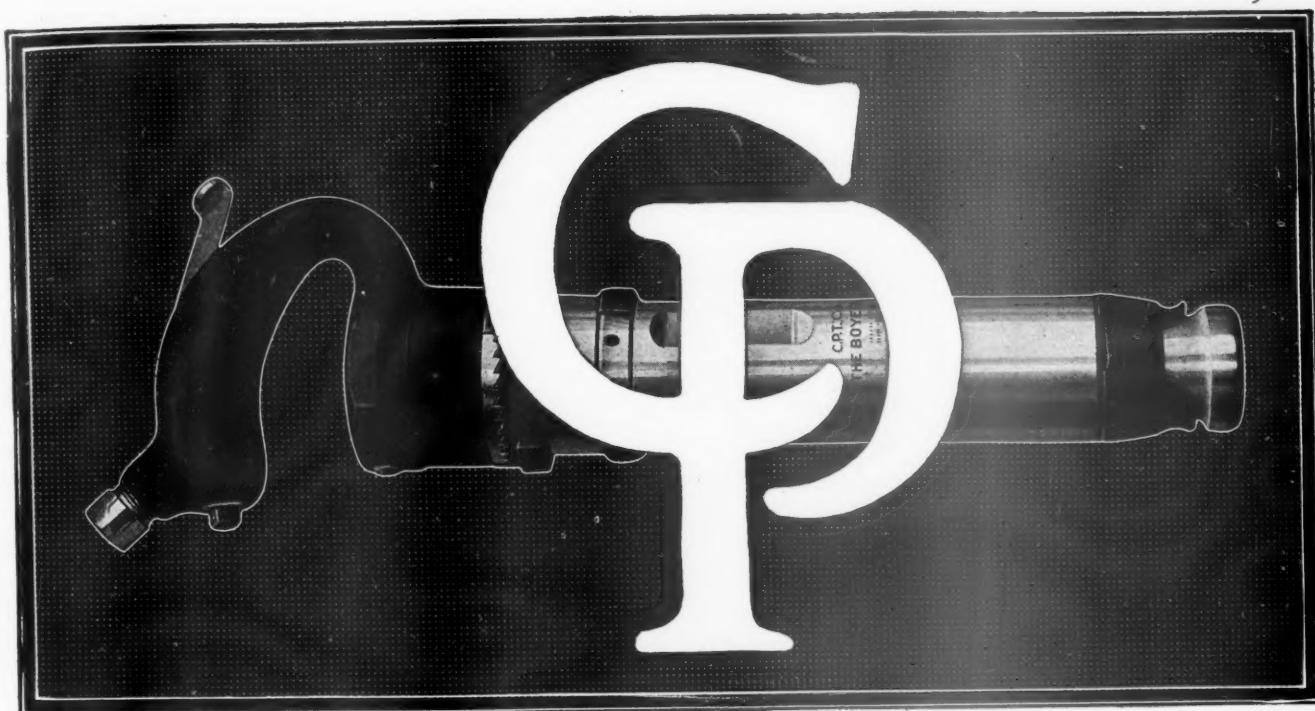
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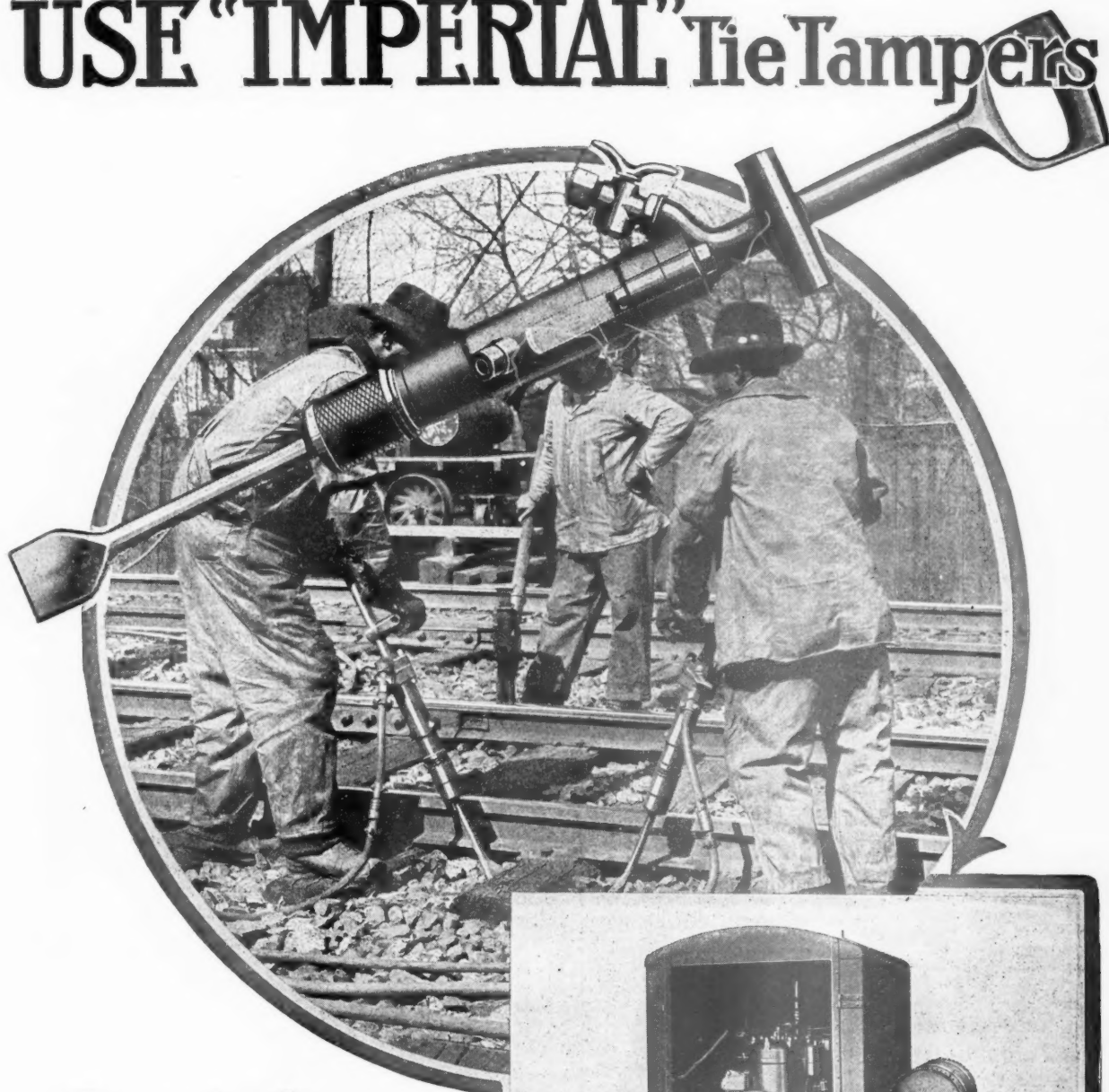
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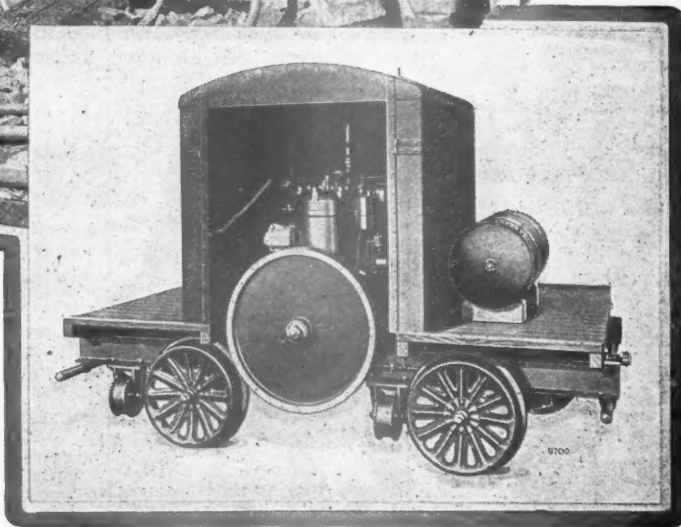


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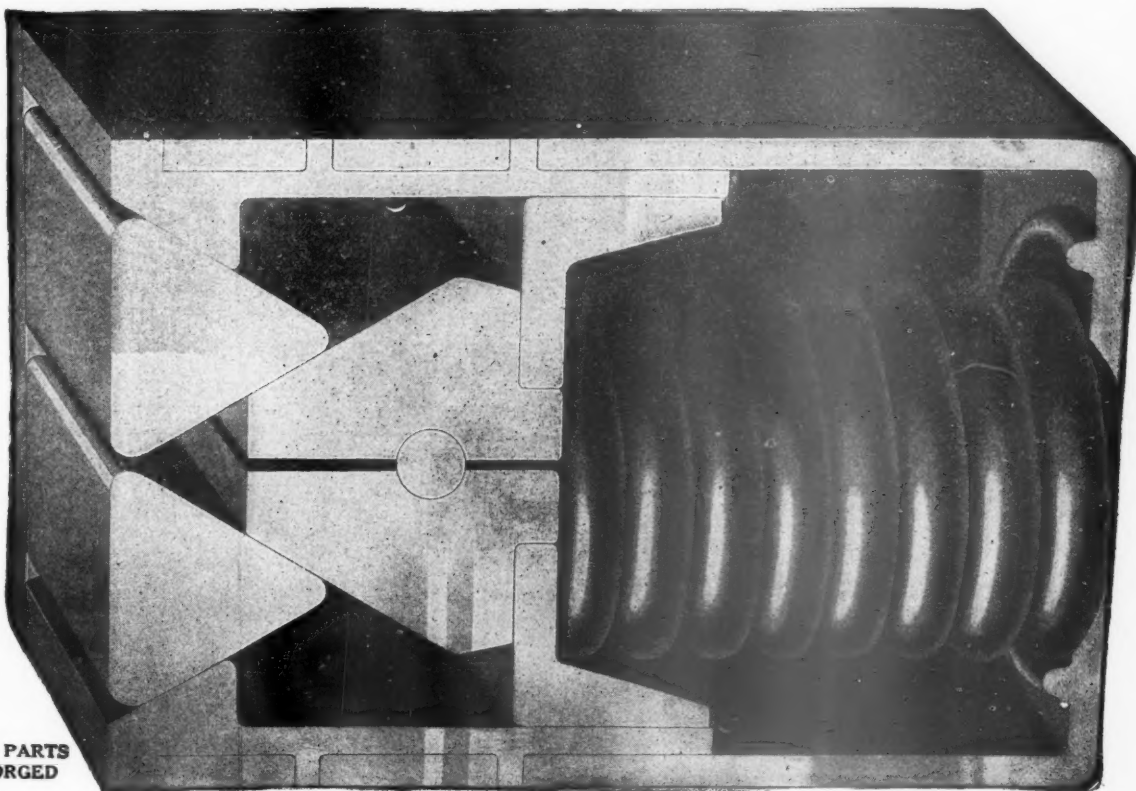
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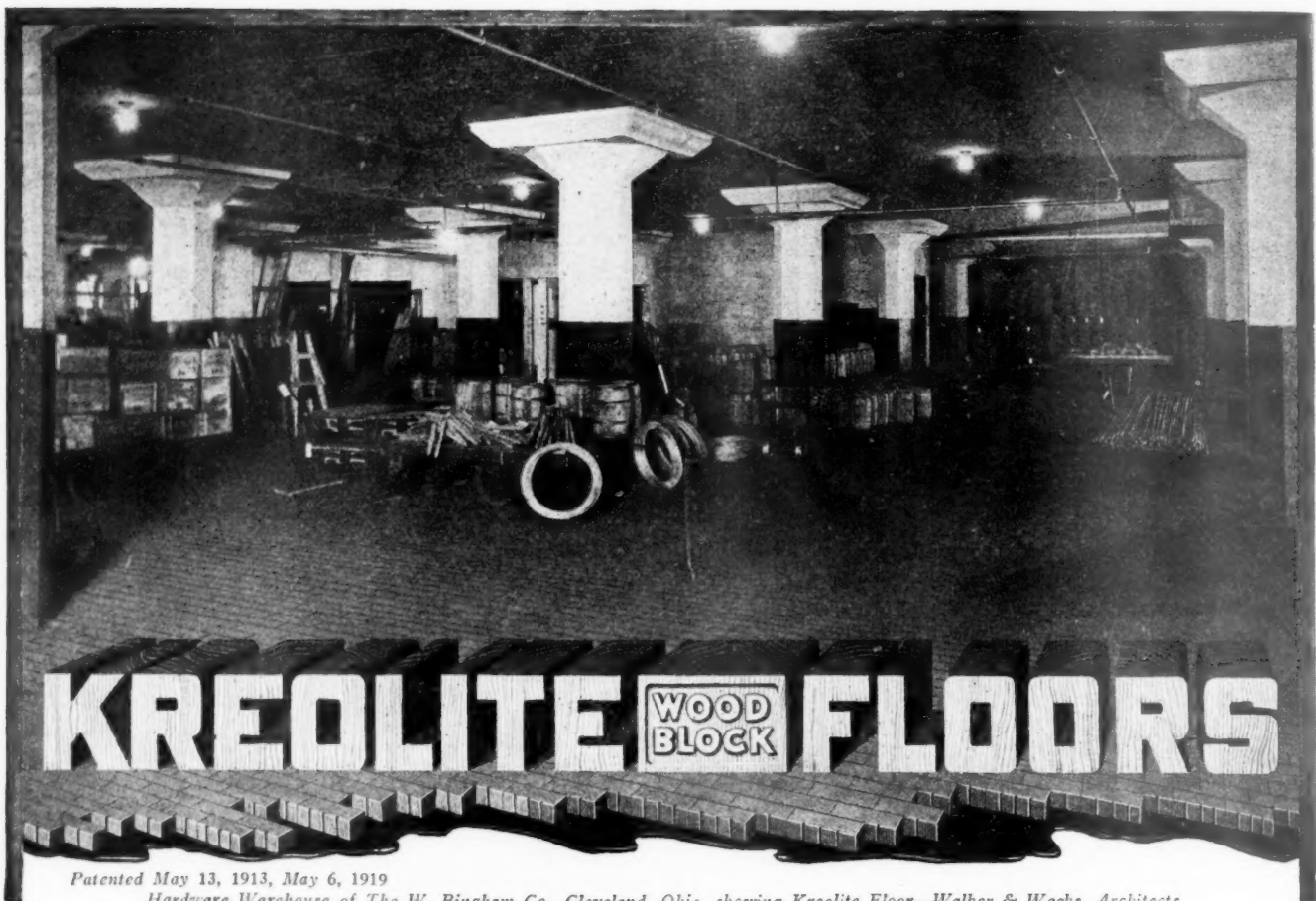
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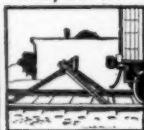
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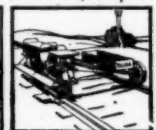
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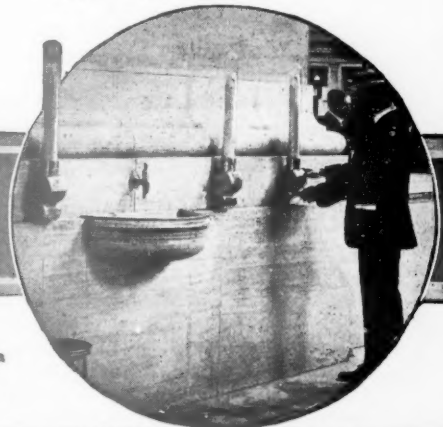
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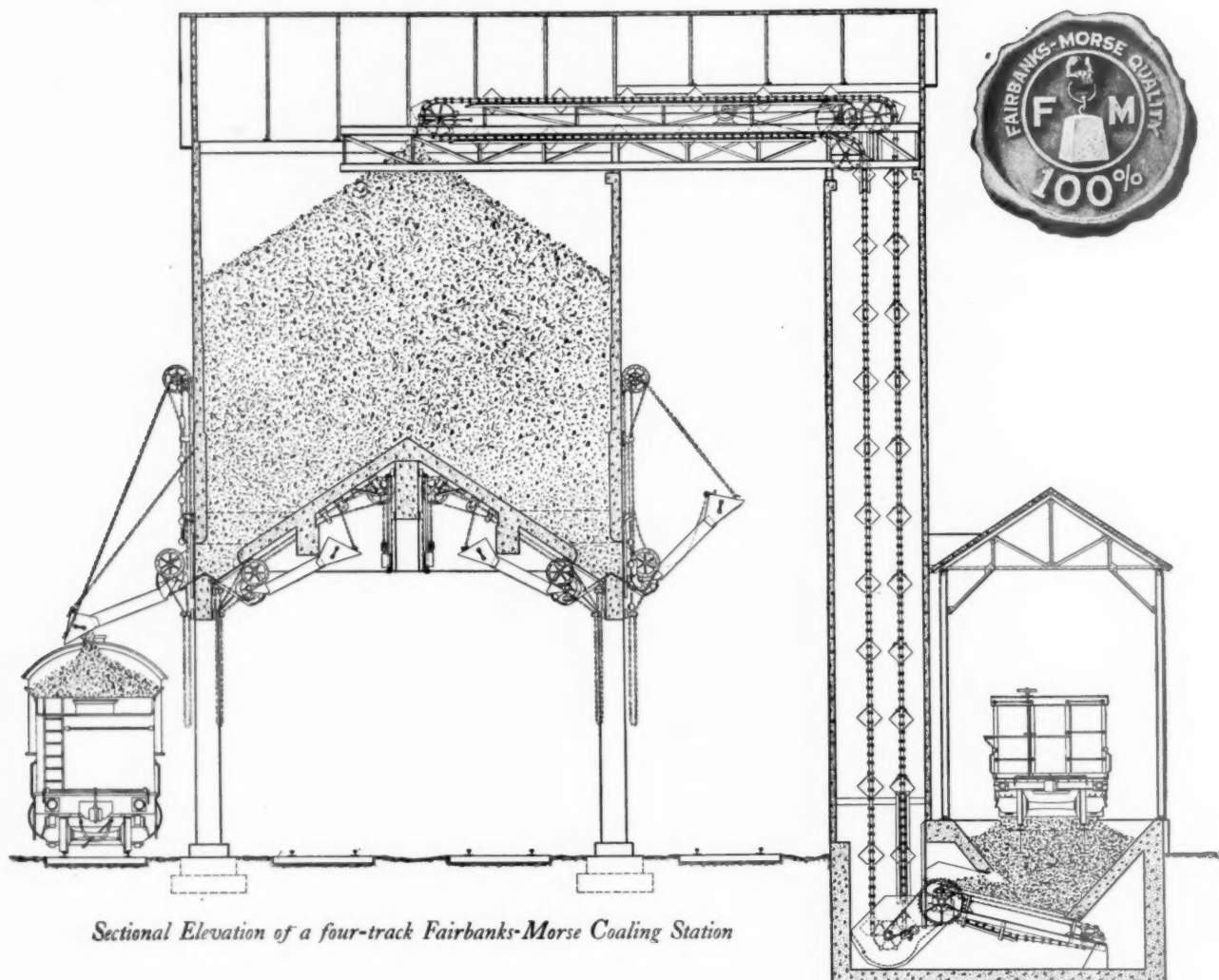
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**S**CIENTIFIC construction of Fairbanks-Morse Coaling Stations insures low operating and low maintenance cost. They are simple in design, have no untried devices—are sturdy and serviceable.

Our Factories manufacture the machinery and coal handling facilities. We design and build the plant and deliver it to you tested and ready for service. There is no divided responsibility. We have built 500 coaling stations on over 100 Railroads in 18 years.

## Fairbanks, Morse & Co.

MANUFACTURERS CHICAGO

*Engines - Pumps - Motors - Hoists - Air Compressors - Fairbanks Scales - Sheffield Motor Cars - Stand pipes - Coaling Stations - Etc.*



## FRESH AIR

**is industrial health insurance**

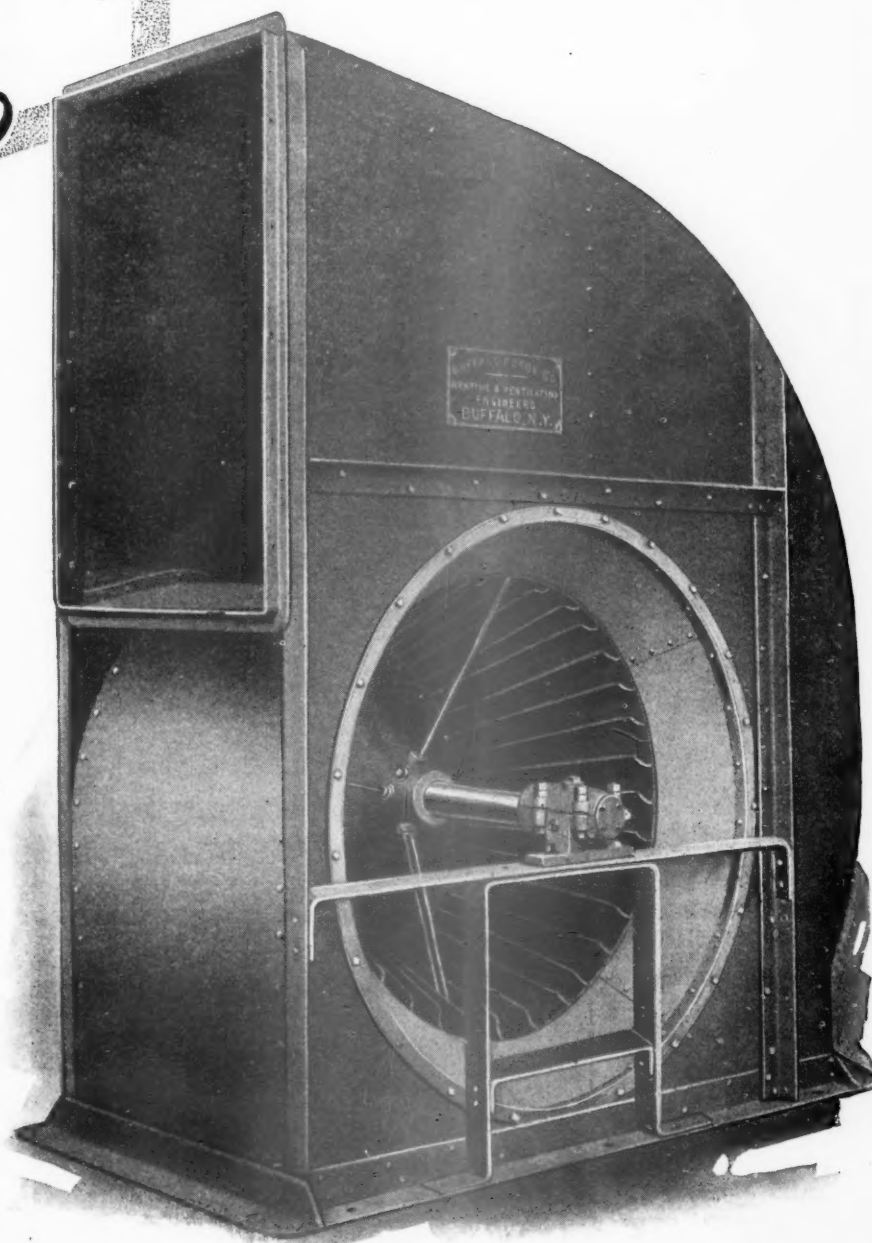
Before making your recommendations for Heating and Ventilating apparatus, consider Buffalo.

Let our engineering department help you with your problem. Their vast fund of practical knowledge is at your disposal.

*Write Dept. 60 for our catalog—it is replete with valuable engineering data and table.*

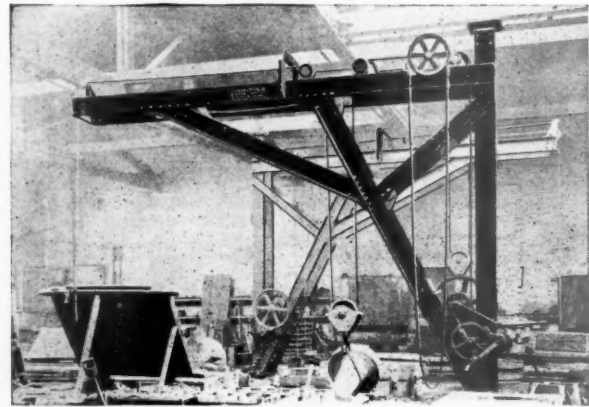
**BUFFALO FORGE COMPANY**  
Buffalo, N. Y.

*“Buffalo”*



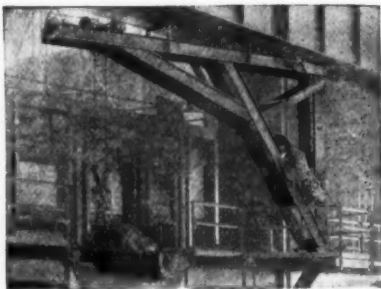


Whiting 3-Motor Jib Crane, 15 tons capacity, Mare Island Navy Yard, Mare Island, Calif.



Whiting Handpower Jib Crane, Type "B", Widely Used in foundry service

## Whiting Jib and Pillar Cranes



Whiting Electric Jib Crane for Handling Spouts of Open-Hearth Furnaces

Are of great service as auxiliaries to overhead travelers or where conditions do not require installing a traveling crane.

Perhaps there is a place in your plant that can best be served by a jib or pillar crane.

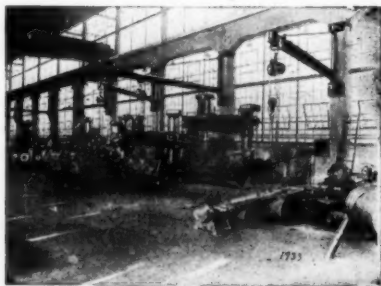
Our wide experience in building such cranes is at your service.

Send for Catalog 151

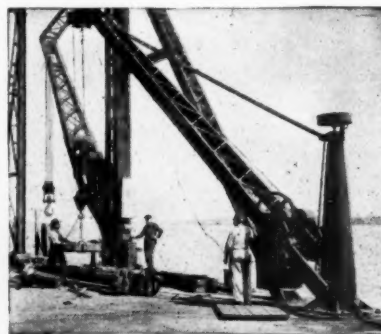
**WHITING FOUNDRY EQUIPMENT CO.**  
**Harvey (Chicago Suburb), Ill.**  
*Representatives in 25 Principal Cities.*



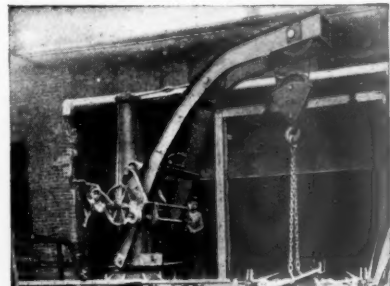
Electric Pillar Crane, 10 Tons Capacity, Naval Ammunition Depot, West Hingham, Mass.



Type "E" Service Jib Cranes for Serving Machine Tools. Midwest Engine Co., Indianapolis, Ind.



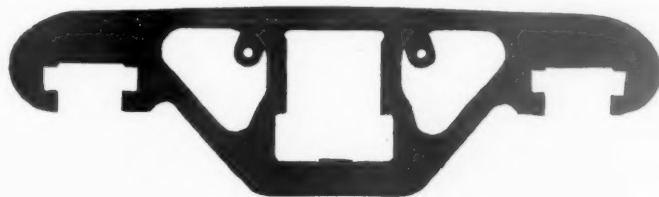
One-Motor Pillar Crane, 5 Tons Capacity, Great Lakes Engineering Co., Detroit, Mich.



Handpower Pillar Crane, 5 tons capacity, Detroit Steel Casting Co., Detroit, Mich.

# WHITING

**CRANES OF ALL TYPES / FOUNDRIES EQUIPPED COMPLETE**



WE MANUFACTURE  
THESE TWO NEW

# Pedestal Truck Side Frames

Box, T—and I—Beam Section

Bolsters

Channel Section Side Frames

and

Scullin Pedestal Side Frames

WE ROLL STANDARD SIZES—

Merchant Bar Squares,  
Rounds and Flats  
six inches and under

Angles  
up to six inches

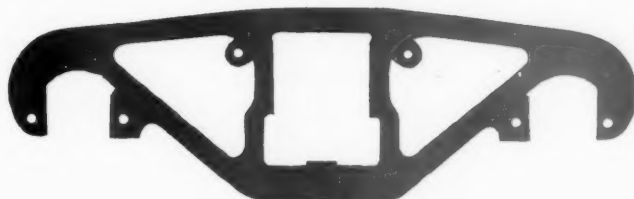
Structural Shapes  
Channels and Beams  
eight inches and under

Light Rails  
up to fifty pounds; special  
sections upon request

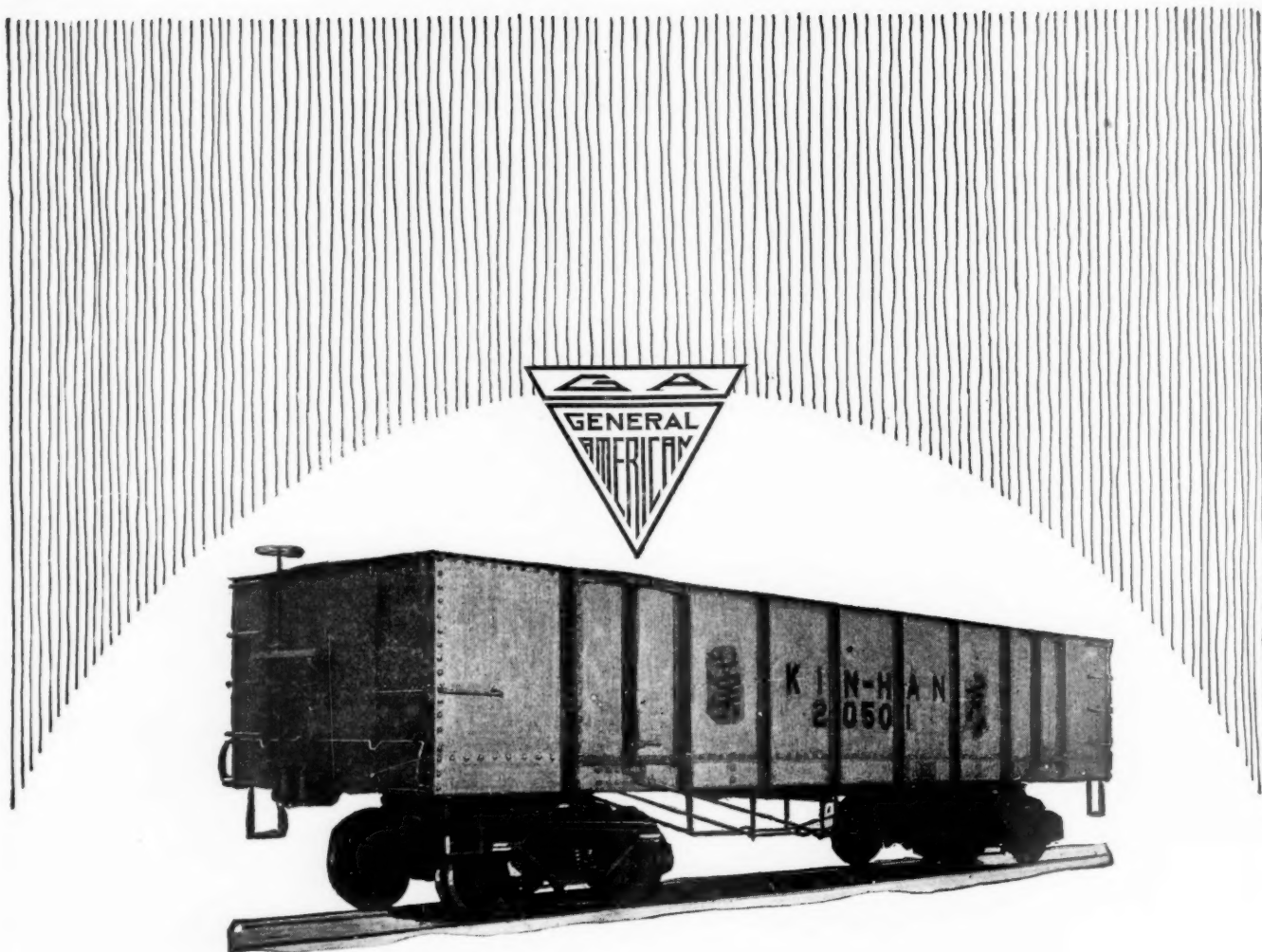
## SCULLIN STEEL CO.

### Open Hearth Steel Products

New York - St. Louis - Chicago







## Supremacy built on service

To make cars that satisfy the demands of modern transportation requires more than designing skill and manufacturing efficiency. It implies an intimate and practical knowledge of shipping problems under widely varying conditions.

There are state and national laws governing shipments of hazardous and perishable commodities. There are railroad rules and standards of construction set by car builders' associations.

That "GA" cars meet the requirements of all these authorities is evidenced by the tens of thousands of "GA" cars in daily use on every road, in every line of industry.

This confidence is the result of years of actual performance, of uninterrupted service, reliable operation, safety, economy.

General American engineers furnish expert advice on every phase of car building free. Write for full information.

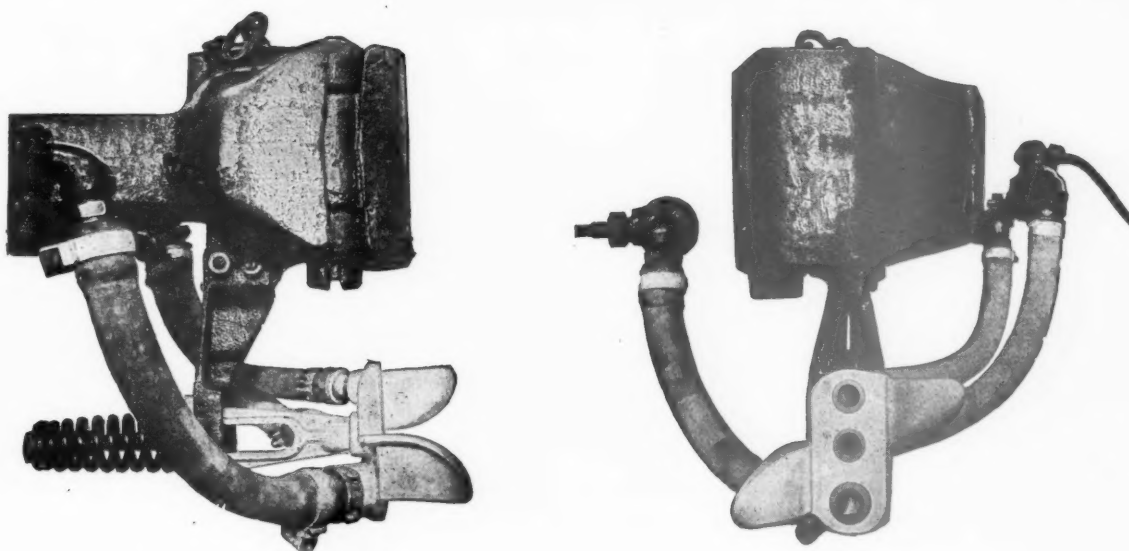
## GENERAL AMERICAN CAR COMPANY

Subsidiary of The General American Tank Car Corporation

General Offices: Harris Trust Building, Chicago, U. S. A.

Plants at: East Chicago, Ind.; Sand Springs, Okla.; Warren, Ohio

Sales Offices: 17 Battery Place, New York  
24 California Street, San Francisco



## 3,000,000 MILES

—of *successful* performance in continuous daily road runs, with scarcely any maintenance expense, surely is convincing proof that the Robinson Connector is an highly efficient equipment.

Its service record of more than six years contains many instances of equally convincing proof that it is also an highly economical equipment.

We do not make these assertions speculatively. They are simple, provable facts.



**THE ROBINSON CONNECTOR COMPANY**

17 BATTERY PLACE  
NEW YORK

*"Building Connectors Is Our Exclusive Business."*

# An Efficient, Effective Arc Welder that Will Increase the Scope of Arc Welding in Any Shop

## Light and Compact

Westinghouse single operator, portable arc-welding units for use where quick, reliable work is essential, are simple in construction and effective in operation. The welder's time is conserved by the ease with which the arc can be started and held.

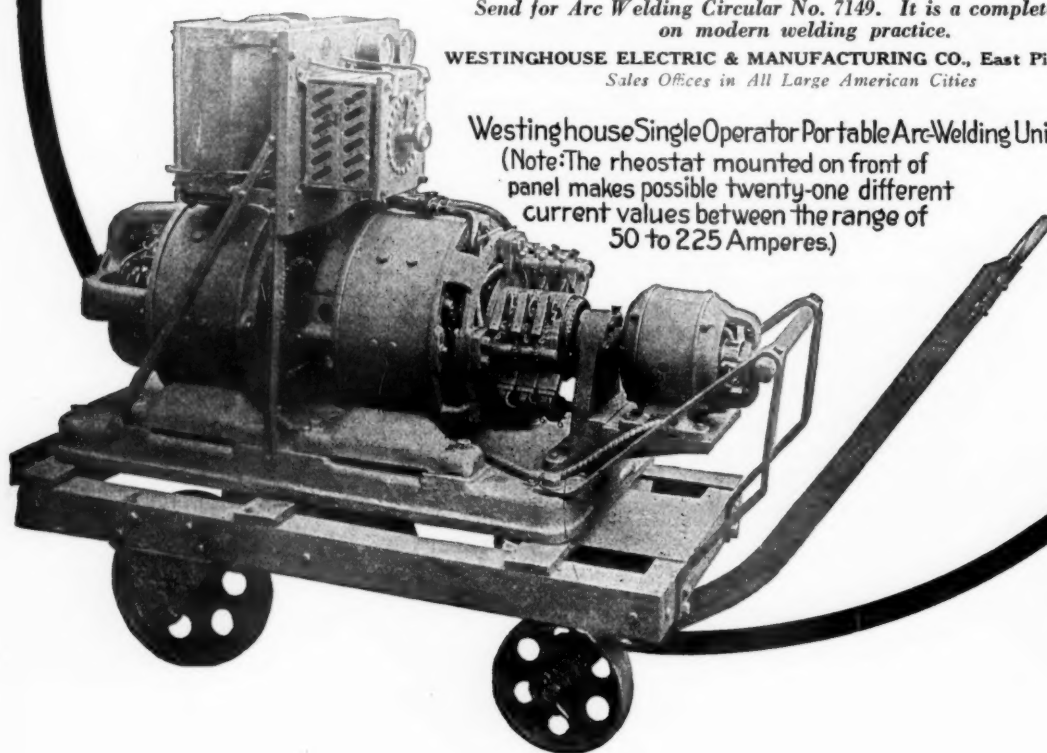
Plenty of "pep" behind the arc gives proper penetration and this, combined with the facilities for obtaining practically any current value from 50 to 225 amperes, insures its application to all classes of welding work requiring metallic electrodes.

Repeat orders for these portable welders are regularly received from large railroad and machine shops.

*Send for Arc Welding Circular No. 7149. It is a complete treatise on modern welding practice.*

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Pa.  
*Sales Offices in All Large American Cities*

Westinghouse Single Operator Portable Arc-Welding Unit  
(Note: The rheostat mounted on front of panel makes possible twenty-one different current values between the range of 50 to 225 Amperes.)



# Westinghouse





## Sufficiency of Grain—Deficiency of Box Cars

There is an abundance of grain throughout the country at large except in the terminal markets, where available stocks are depleted to a point considerably below current necessities.

It is estimated that nearly 50,000 cars of grain are awaiting box car equipment for movement marketward. This is the residue from last year's crop, and considerable difficulty will be experienced in moving the old crop to market before the new crop becomes available.

Box car shortage thus continues to exercise a restrictive influence upon the movement of grains, and to assert itself as a potent factor in the present economic situation. Much of the present high cost of living is due to the forced withholding of food products from market.

The available supply of box cars must be augmented not only to insure an uninterrupted movement of grain crops to market during the coming fall and winter, but also to provide adequate facilities for the expeditious handling of the other products of industry which require box car loading.

Box car tonnage represents one-third of the aggregate tonnage of the country; box cars comprise about 45%, numerically, of the freight car family. This affords an index of the relative importance of the box car in our modern transportation system.

The Association of Railway Executives places the present shortage of all types of freight cars at 226,000. Distributing this shortage proportionately among the various classes of cars on the basis of established percentage relations, we have a present need of 101,000 additional box cars.

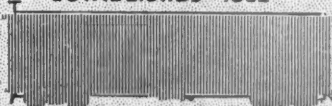
The present equipment shortage is not a circumstance to what it will be during the coming fall and winter, when the peak of the traffic movement will be attained. To meet present and future traffic demands the railroads are making every effort to increase their facilities; in the meantime they must have the hearty co-operation of the public in securing the most intensive utilization of every unit of available equipment.

**LOAD AND UNLOAD CARS PROMPTLY.  
LOAD CARS TO THEIR MAXIMUM  
CARRYING CAPACITY.**

# Haskell & Barker Car Company, Inc.

ESTABLISHED 1852

Office Railway Exchange  
Chicago, Ill.



Works Michigan City,  
Indiana.

# CAR LIGHTING

Chicago  
Philadelphia  
St. Louis

THE SAFETY CAR HEATING AND LIGHTING CO.  
2 Rector St., New York

Montreal  
Boston  
San Francisco

## VAPOR CAR HEATING CO., Inc.

RAILWAY EXCHANGE, CHICAGO

SUCCESSOR TO

CHICAGO CAR HEATING CO. — STANDARD HEAT & VENTILATION CO., Inc.  
CHICAGO NEW YORK BOSTON 408 Virginia Railway Bldg., RICHMOND, VA. PHILADELPHIA MONTREAL

## GREENVILLE STEEL CAR CO.

Manufacture Steel Underframes, Pressed Steel Shapes and Forgings  
Rebuild and Repair Steel Freight Cars.

Greenville, Penn'a.

## UNION SPRING & MANUFACTURING CO.

Coil Springs, Elliptic Springs, Steel Castings, Pressed Steel Spring Plates and Pressed Steel Journal Box Lids

KENSINGTON JOURNAL BOX—All Steel

GENERAL OFFICES: 1207 Fulton Bldg., Pittsburgh, Pa.

50 Church Street, New York, N. Y.  
Fisher Building, Chicago, Ill.

Todd Building, Louisville, Ky.  
Mutual Building, Richmond, Va.



The long-wearing, rich-appearing upholstery material—inexpensive and distinctive.

**L. C. CHASE & CO., Boston**  
NEW YORK DETROIT CHICAGO  
SAN FRANCISCO

The standard upholstery for over a third of a century—grades for all uses.

**CHASE**  
**Goat Brand Car Plush**

## FOSTER SUPERHEATER

For decided power improvement with steam and fuel economy, and minimum maintenance. Convenient access for renewal of any single element.

POWER SPECIALTY COMPANY

Boston, Philadelphia, Pittsburgh,  
Chicago, San Francisco, London, Eng.

111 BROADWAY, NEW YORK 10

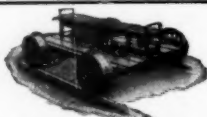


Electric Arc Welders  
Car-Lighting Equipments and Car-Lighting Storage Batteries

U. S. LIGHT & HEAT CORPORATION  
Niagara Falls, N. Y.



SECTION CARS



INSPECTION CARS



16' AND 20' WHEELS



PUSH CARS



HAND CARS

**Mudge & Company**

Factory—On Belt R. R., Chicago

Main Office—Railway Exchange, Chicago

Branch Offices—New York, St. Louis, Denver, San Francisco

# CRECO

DESIGN  
PRODUCTION  
OPERATION

COMBINED THESE  
FACTORS EMPHASIZE  
THE PRINCIPLES UPON  
WHICH WE BUILD

CRECO BRAKE-BEAM SUPPORTS

**CHICAGO RAILWAY EQUIPMENT CO**  
McCormick Bldg CHICAGO



# PRESSED STEEL CAR CO.

New York,

Pittsburgh,

Chicago,

Washington, D. C.

St. Paul

## CARS

*Of Every Description*

Cars Repaired

Repair Parts

Cast Iron Chilled Car Wheels

Steel and Malleable Castings

# MT. VERNON CAR MANUFACTURING CO.

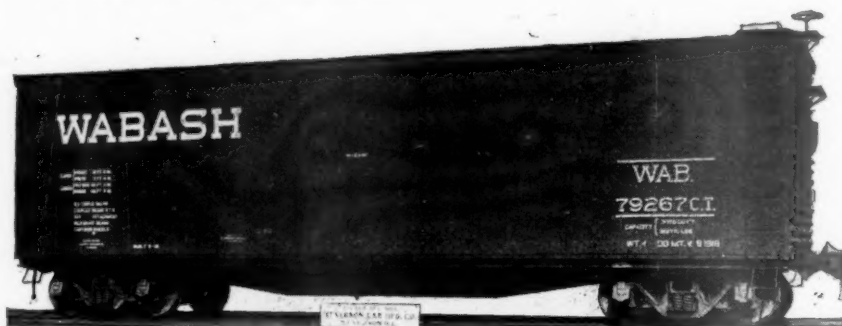
MT. VERNON, ILL.

Manufacturers of

## Freight Cars

of Every Description

## Steel and Wood

Car Wheels, Forgings,  
Pressed Steel Shapes, Brake  
Beams, Carlines.Capacity: 10,000 Cars,  
150,000 Wheels, 20,000 Tons  
Forgings, per annum.

**FREIGHT CAR DOOR FIXTURES AND REPAIR PARTS**  
**BOTTOM SUPPORTED :: :: TOP SUPPORTED**  
**BURGLAR AND WEATHER-PROOFING DEVICES**

## CAMEL COMPANY

332 So. Michigan Ave.  
 CHICAGO, ILL.

# STONE FRANKLIN CAR LIGHTING SYSTEM

*Reliable, Dependable, Economical, Efficient*

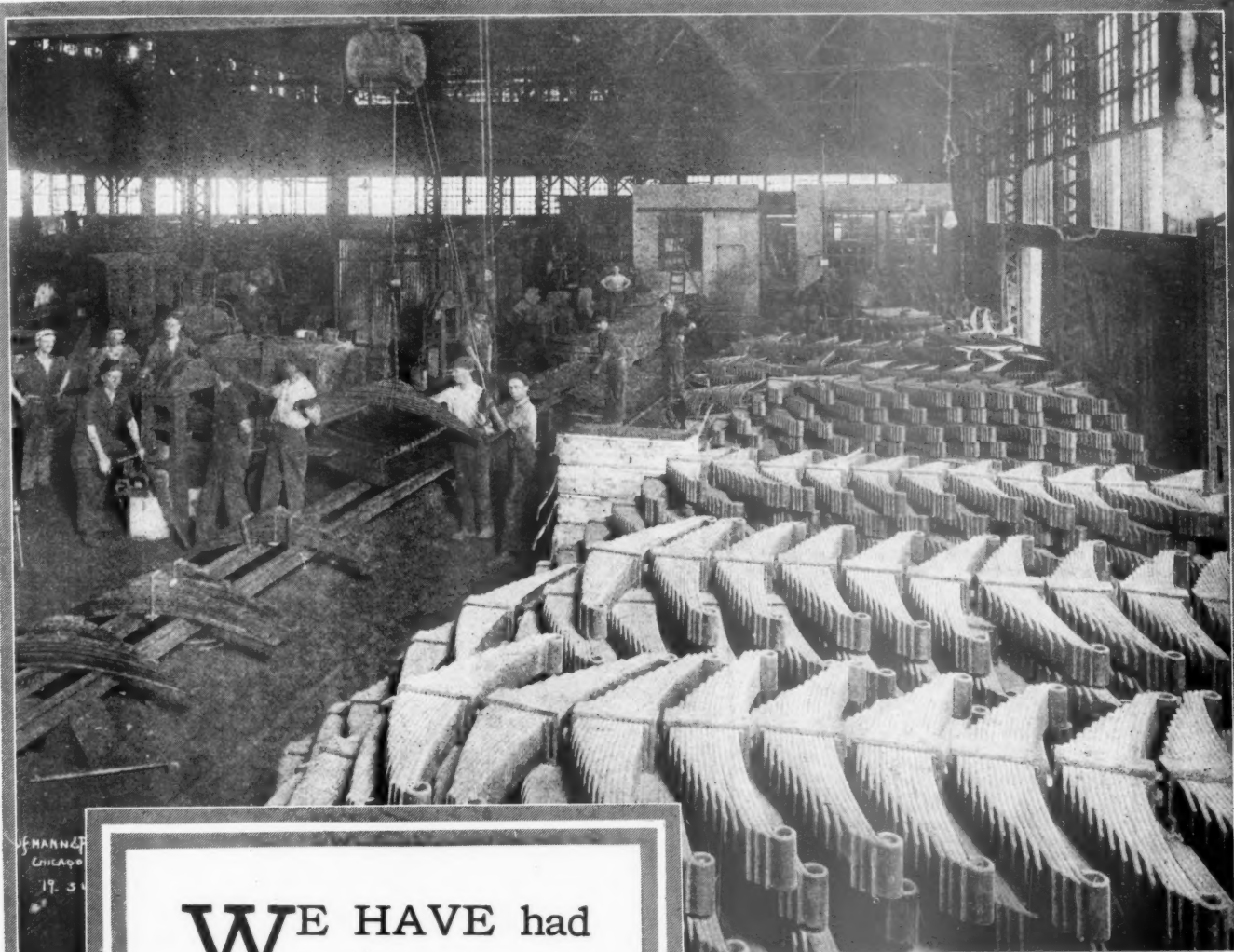
Stone Franklin speed controlled generator means  
 satisfactory lighting at all times and increased battery life.

## STONE FRANKLIN COMPANY

18 East 41st Street, New York

Transportation Bldg., Montreal

# SPRINGS



**WE** HAVE had years of experience in the manufacture of all types of springs for cars and locomotives. Elliptic, coil and volute springs of any desired capacity can be furnished.

**American  
Steel  
Foundries**

**CHICAGO  
NEW YORK ST. LOUIS**

# CERTIFIED MALLEABLE CASTINGS

THE AMERICAN MALLEABLE CASTINGS ASSOCIATION

**ACA**  
**CERTIFIED**

## When Your Certified Castings Arrive

You will not be in doubt about their physical properties—how they will act under strain and shock or whether they will be up to former standards.

The word "CERTIFIED" on your shipping tag is your guarantee of definite physical properties and the best that modern science and experience can produce.

**Those to whom certificates have been issued for the 1st quarter of 1920:**

Albion Malleable Iron Co., Albion, Mich.  
American Malleables Co., Owosso, Mich.  
Belle City Malleable Iron Co., Racine, Wis.  
Chain-Belt Co., Milwaukee, Wis.  
Chicago Malleable Castings Co., West Pullman, Chicago, Ill.  
Chisholm-Moore Mfg. Co., Cleveland, O.  
Columbus Malleable Iron Co., Columbus, O.  
Danville Malleable Iron Co., Danville, Ill.  
Dayton Malleable Iron Co., Dayton, O., and Ironton, O.

Eastern Malleable Iron Co.—  
Naugatuck Malleable Iron Works, Naugatuck, Conn.

Bridgeport Malleable Iron Works, Bridgeport, Conn.

Troy Malleable Iron Works, Troy, N. Y.

Wilmington Malleable Iron Works, Wilmington, Del.

Vulcan Iron Works, New Britain, Conn.

Erie Malleable Iron Co., Erie, Pa.

Federal Malleable Co., West Allis, Wis.

Fort Pitt Malleable Iron Co., Pittsburgh, Pa.

Frazer & Jones Co., Syracuse, N. Y.

Globe Malleable Iron & Steel Co., Syracuse, N. Y.

Haskell & Barker Car Co., Michigan City, Ind.

Illinois Malleable Iron Co., Chicago, Ill.

Iowa Malleable Iron Co., Fairfield, Ia.

Laconia Car Co., Laconia, N. H.

Marion Malleable Iron Works, Marion, Ind.

National Malleable Castings Co., Cleveland, O.; Chicago, Ill.; Indianapolis, Ind.; Toledo, O.; E. St. Louis, Ill.

Northern Malleable Iron Co., St. Paul, Minn.

Northwestern Malleable Iron Co., Milwaukee, Wis.

Pittsburgh Malleable Iron Co., Pittsburgh, Pa.

Rockford Malleable Iron Works, Rockford, Ill.

Ross-Meehan Foundries, Chattanooga, Tenn.

St. Louis Malleable Casting Co., St. Louis, Mo.

Stowell Co., South Milwaukee, Wis.

T. H. Symington Co., Rochester, N. Y.

Terre Haute Malleable & Mfg. Co., Terre Haute, Ind.

Vermilion Malleable Iron Co., Hoopston, Ill.

Wanner Malleable Iron Co., Hammond, Ind.

York Manufacturing Co., York, Pa.

**The American Malleable Castings Assn.**

The 1900 Euclid Bldg.,  
Cleveland, Ohio

The Association solicits correspondence concerning any serious complaint users of Malleable Castings may have as to the quality of Malleable Iron furnished by any of the firms listed. Such complaints will be rigidly investigated.



STAFF



# **"STANDARD"**

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings

Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells

Steel Springs



*"The 'Standard' Brand on your material  
is an assurance of eventual economy."*



## **STANDARD STEEL WORKS CO.**

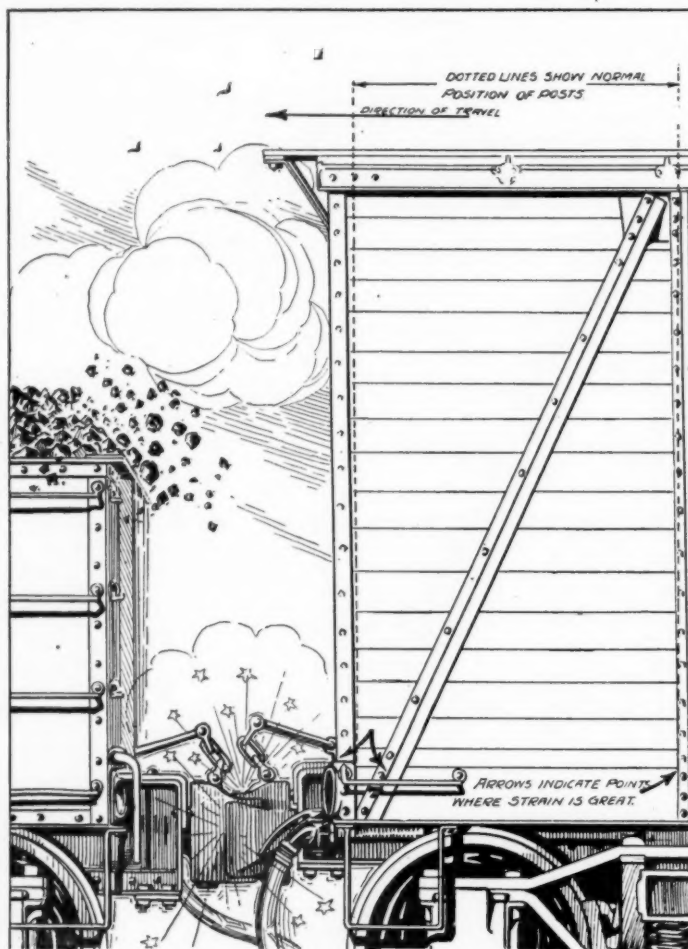
GENERAL OFFICES:

**500 NORTH BROAD ST., PHILADELPHIA, PA.**

CHICAGO  
ST. LOUIS  
HAVANA, CUBA

RICHMOND  
SAN FRANCISCO  
NEW YORK  
MONTEREY, MEX.

MEXICO CITY  
LONDON, ENGLAND  
PARIS, FRANCE



## The Car Stops Suddenly But The Outside Metal Roof Keeps On Going

Because it has about 500 pounds of unnecessary weight in the roof. This weight works at the end of an 8-foot lever. The less weight there is in the roof, the less strain there is on the side and end framing when the car is stopped suddenly in switching or other service.

### HUTCHINS ALL STEEL FLEXIBLE ROOFS

relieve the car superstructure of this strain. The essential requirements of the roof, water-proofing and load-carrying, are provided by steel twice as thick as that used in outside metal roofs, but much lighter than the combined board and metal roof, strengthening the car superstructure by reducing the superimposed weight.

**HUTCHINS CAR ROOFING COMPANY**  
DETROIT MICHIGAN

New York

Chicago

St. Louis

St. Paul

## SERVICE PARAMOUNT

For years this country has boasted of the lowest freight rates in the world.

Service—not low rates—is what the country needs.

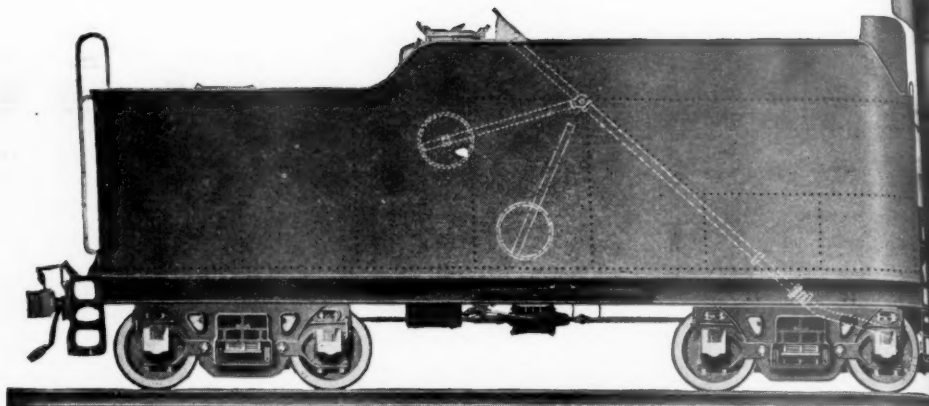
To-day freight is waiting to be moved, waiting for cars, locomotives and terminals.

It is waiting because the rates are too low to provide increased facilities for the growing business of the country.

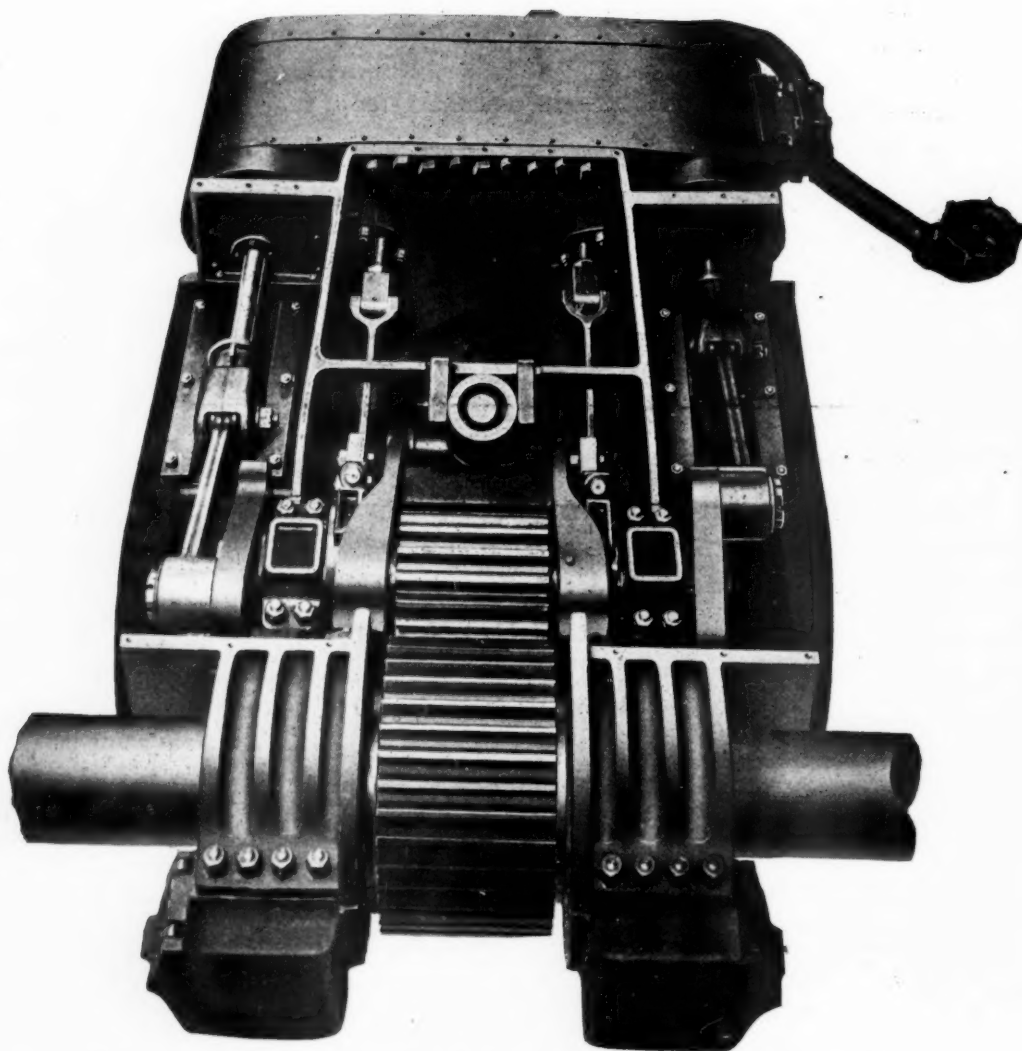
Tell the Interstate Commerce Commission what low rates are doing to your business right now.

G. M. BASFORD CO.



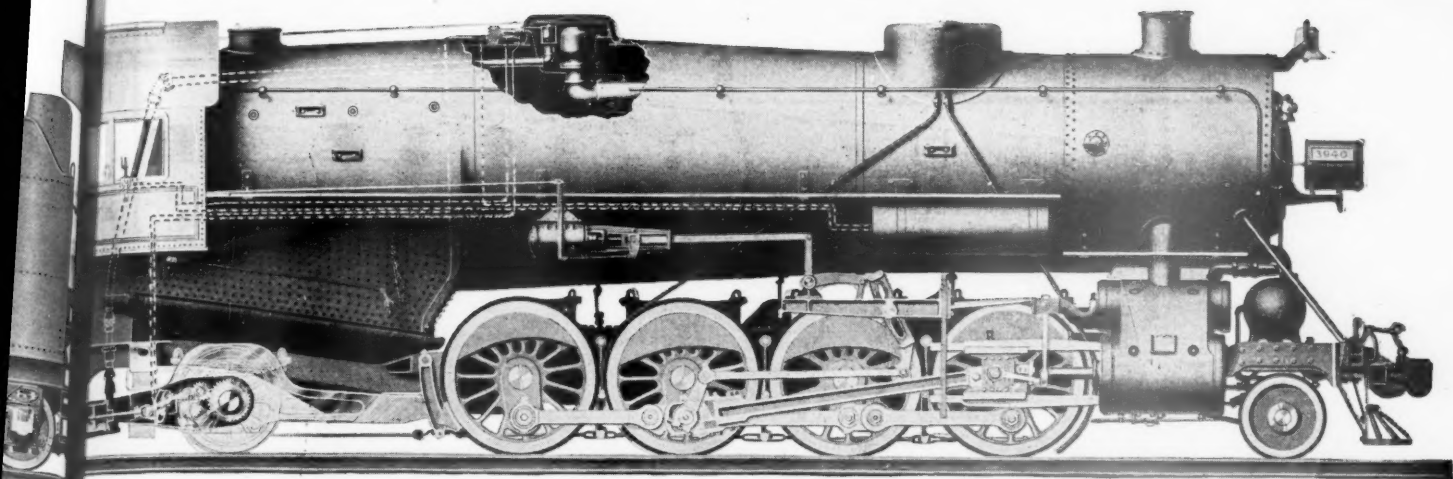


Locomotive Booster



Locomotive Booster driving through gears to trailer axle—cover removed.

The Locomotive Booster was planned with the idea of increasing the reliability of operation by giving the engine man additional resources. The governing idea is to make this resource available at desired times; to improve the average operating conditions rather than to increase maximum trains; to apply the Booster in a manner not to interfere with the equation and function of the locomotive or truck; to impose no additional duties on the engine man; to have it normally inoperative, and to minimize wear in order that the repairs will fall on the back shops at the time the engine is given general repairs rather than on the roundhouse.



Booster applied to Mikado Locomotive

## THE 1920 LESSON

Conservation is the law of life. It is the goal of duty. It is itself the reward of effort.

The 1920 lesson in conservation is the Booster.

It is more than a lesson in conservation. The Booster puts any locomotive with trailing wheels into the class above itself as to tractive effort.

It defers the need for new engines. This is more than conservation.

### Franklin Railway Supply Company, Inc.

Export Department—International Railway Supply Co.

30 CHURCH STREET

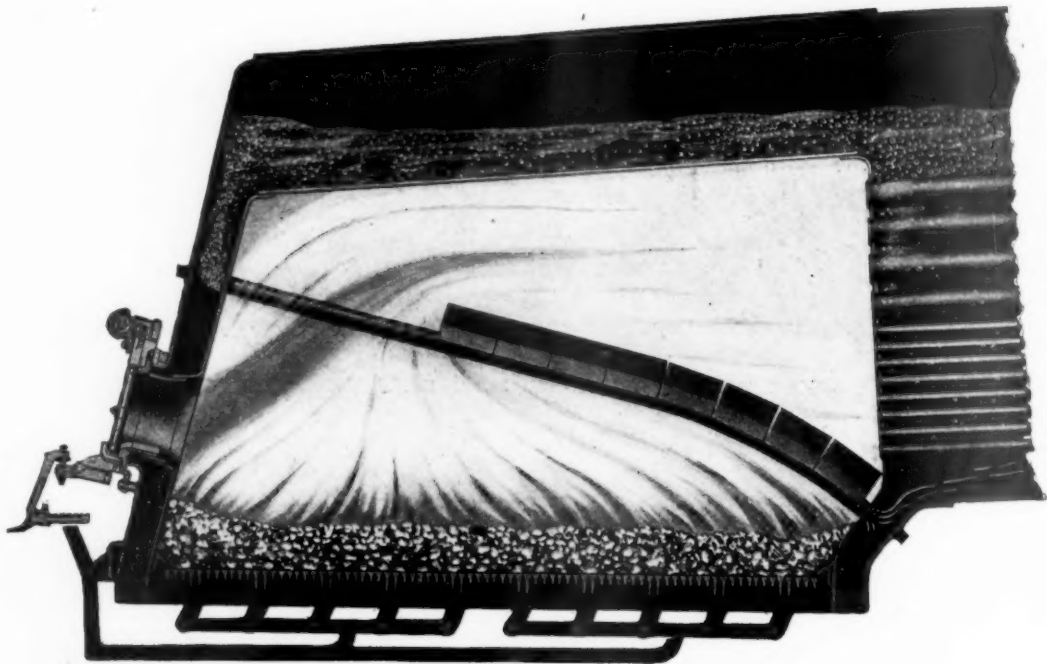
NEW YORK

332 So. Michigan Avenue  
Chicago

1112 Praetorian Bldg.  
Dallas, Tex.

728 Monadnock Bldg.  
San Francisco, Cal.

Franklin Railway Supply Co. of Canada, Limited, Montreal



MIXING OF GASES IS VITAL TO GOOD COMBUSTION

## A DAY'S WORK

An honest day's work from every man in the country would bring down the high cost of everything.

Everybody knows this.

A perfect day's work from every locomotive in the country would help also.

No locomotive can do a perfect day's work unless it has an arch in its firebox.

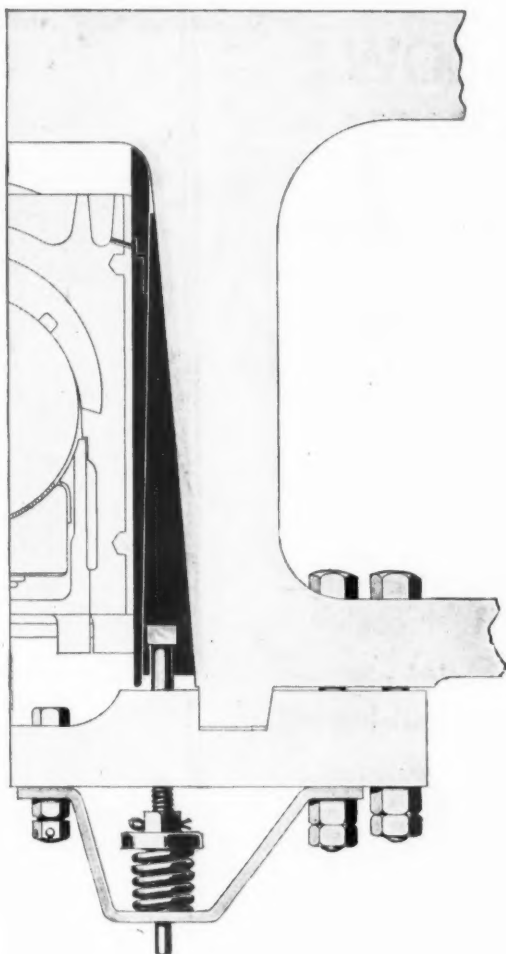
## AMERICAN ARCH COMPANY

McCORMICK BLDG.  
CHICAGO, Ill.

30 CHURCH STREET  
NEW YORK



# SERVICE



Extra miles of service between shoppings is what Franklin Automatic Wedges give engines.

Driving box slack is kept from developing by automatic adjustment of wedges as the engine works.

They do what even the most expert workman could not do because such workman cannot, like the Franklin Wedge, be always on the job.

Franklin Wedges protect every bearing on the engine.

## Franklin Railway Supply Company, Inc.

Export Department—International Railway Supply Co.

30 CHURCH STREET, NEW YORK

332 So. Michigan Avenue  
Chicago, Ill.

1112 Praetorian Bldg.  
Dallas, Texas

728 Monadnock Bldg.  
San Francisco, Cal.

Franklin Railway Supply Company of Canada, Limited, Montreal



Rome Hollow Staybolt Iron is of the same quality as Rome Superior. Its use means staybolt economy.

## ROME HOLLOW SAVES MONEY

Fixing staybolts the day they break saves money.

It takes a severe strain to break a staybolt, when one breaks its load is transferred to adjacent bolts, causing additional breakage.

Rome Hollow Staybolts have a truly round central hole their entire length.

A fractured bolt reveals itself instantly—often before it is broken clear through.

This permits quick renewal before adjacent bolts are overstrained and without holding the engine off its run.

**Rome Iron Mills, Inc.**

**30 Church St., New York**

**Works:**

**Rome, N. Y.**



PUMP



HEATER

## Feed Water Heater Savings

Coal	Saving per 12 tons burned	Saving per 10 tons burned
\$4.00 Per Ton	\$8.50	\$7.04
4.50 "	9.56	7.92
5.00 "	10.62	8.80
5.50 "	11.68	9.68
6.00 "	12.75	10.56

Every time 12 tons of coal are burned the saving is \$12.75 when coal costs \$6.00 and the saving is 15% of the coal burned while running.

It is figured this way—

$12 \div .85 = 14.125$  tons burned without heater

$14.125 - 12 = 2.125$  tons saved

$2.125 \times \$6 = \$12.75$  saved for every 12 tons burned

**Locomotive Feed Water Heater Co.**  
30 Church Street New York





## NEW POWER

Is your new power to be a reproduction of existing engines?

Lima can make the duplication.

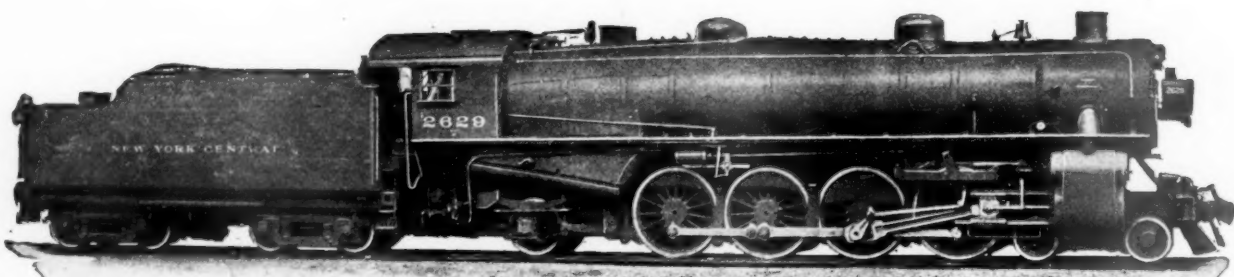
Is it to be a new design?

Lima engineers will gladly co-operate to meet your special requirements.

## Lima Locomotive Works, Incorporated

Lima, Ohio

30 Church Street, N. Y. City



## An Institution Which Serves

There is a genuine appreciation among railway mechanical officials for the need of more vigorous and aggressive action in the application of means to reduce operating costs.

These men know the practical advantages which have followed the application of superheaters to their road locomotives.

But how far have you developed your switch engines?

Economy in fuel and a sustained increase in car movement are factors of as great importance for your switch engines as for your road engines.

And your terminals and shop power plants—what progress toward increasing their efficiency?

It pays to superheat switch engines.

It pays to superheat stationary power plants.

The Locomotive Superheater Co. is an institution which serves railway mechanical men who are working toward reduced operating costs.

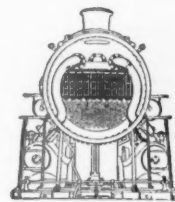
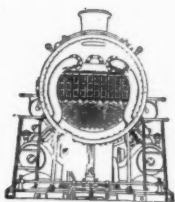
We invite you to study the progress our engineers have made in the development and application of the Elesco method of superheating.

### LOCOMOTIVE SUPERHEATER CO.

General Offices—30 Church St., New York

Chicago—Peoples Gas Bldg.

Designing Engineers and Manufacturers  
of Elesco Steam Superheaters and pipe  
coils for all purposes.



# How Much Thought Do You Give?

**H**OW much thought do you give—you men who manufacture devices and material used in modern railway signaling—to the fact that the RAILWAY SIGNAL ENGINEER is the only paper in the World devoted to the interest of those railway officials and their subordinates who must know how signals are made, erected, operated and maintained. In short, that to all who have to do with the installation and maintenance of signals, the RAILWAY SIGNAL ENGINEER has proved a guide in which they place the utmost confidence.

Remember, the art of railway signaling is developing rapidly, and the best literature of the subject is based on the knowledge that experience and study add to it day by day. Railway Signal officials know this, and more—they know that such data forms the basis of the articles placed before them each month in the RAILWAY SIGNAL ENGINEER.

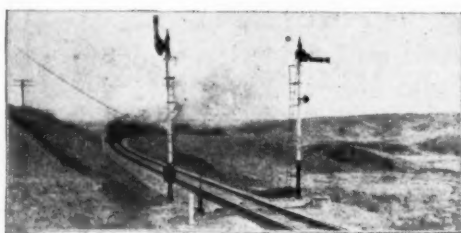
Stop for a moment—you who produce signal devices—stop and reflect how receptive a field you are sure to reach through the sending of your sales message to these, men in the pages of the signal official's own publication.

## SIMMONS-BOARDMAN PUBLISHING Co.

"The House of Transportation"



New York  
Chicago  
Washington  
Cleveland  
Cincinnati  
London



Automatic Signals Expedite Freight Movement

What a Study of the Conditions on the Northern Pacific Shows.  
The Savings Effected in Equipment and Men

**A** SAVING of one hour in running time over a division for each freight train by the use of automatic signals may appear to be a small item, but an analysis of what such a saving means in equipment, men and money on a 100-mile division shows that it is highly important. With an average of 16 trains a day over the division this means a total saving of 16 train hours, which, as will be shown below, is equivalent to over three freight locomotives being made available for other work, while 278 freight cars are also released, aggregating a saving involving an equipment investment of \$303,400, with a saving in overtime of approximately \$15,359.

Applying the result of this study to the lines in this country at present unequipped and assuming an average number of freight trains over each track daily of 7, it is found that the total freight train hours which can be saved each day by the use of automatic block signals will amount to 17,004 hours. Such a saving is equivalent to the release of 2,902 freight locomotives and 190,128 freight cars.

#### Conditions Affecting the Study

In order to determine what effect automatic block signals on single track had on the speed of freight trains in an actual installation, a study has been made of train operation on the first subdivision of the Montana division of the Northern Pacific, before and after the installation of signals. This division extends from Billings, Mont., to Livingston and is 115.7 miles in length; from Billings to Laurel, a distance of 15.5 miles, the line is double track, the line between Livingston and Laurel, a distance of 100.4 miles, is single track. On this piece of single track there are 20 passing points, so that passing tracks average a little less than five miles apart. Of these 20 passing points, 7 have lap sidings and the capacity of such siding was 75 cars at the time automatic signals were installed, and for some time after.

The line rises almost continuously to the west, there being only seven miles of level track or descending grade westbound in this entire distance. The maximum grade westbound is 0.5 per cent and there is over 30 miles in which the grade is 0.45 per cent or heavier.

Three position upper-quadrant automatic signals, with a standard overlap scheme of control, were installed during 1910. There were 175 of these signals on the single-track portion of the line, or approximately 17 signals per mile. The maximum length of blocks between sidings is about 2½ miles.

Between 1908 and 1912 no change was made in the number or length of passing sidings, but between 1912 and 1916 some passing sidings were lengthened, and during the summer of 1917 the remainder were lengthened so as to give them a capacity of 99 cars each. At the same time the signals were relocated and the control changed to the A. P. B. system. During 1908 and 1909 the freight engine division extended from Billings to Livingston. In 1910 a new yard was built at Laurel, and the engine division shortened to extend from Laurel to Livingston, a distance of 101.6 miles.

For more than 10 years the Northern Pacific has used "10" orders for dispatching trains, the "11" order being almost entirely unknown. For a part of 1909, however, an experiment was made with the A. B. C. system of train dispatching. This, however, was discontinued in 1910 and the old method returned to. There are nine telegraph offices between Laurel and Livingston which are open both day and night.

#### Comparative Conditions

In making a comparison of train speeds with and without automatic block signals, it is obvious that all conditions other than block signals should be equal. Not only should the number and length of passing tracks be the same and the same method of dispatching be followed, but the comparison should be made for periods in which the density of traffic is equal. Owing to the fact that the A. B. C. system of train dispatching was used during the year previous to the installation of the automatic block signals, the year 1908 was used as typical of operation before the installation of signals.

January, 1919

RAILWAY SIGNAL ENGINEER

5

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It was found that the greatest saving of traffic on this part of the road usually occurred during the month of October. Consequently this month was used in making the comparative study. An examination of the train records showed that while the traffic during the months of October, 1908 and 1909, was substantially the same that, during 1911, or the first year after the installation of block signals, was not. However, the traffic during the month of October, 1912, was substantially the same as in 1909. A comparison of the train sheets for these months shows that there were 20 days in the month of October, 1908, in which the number of trains of all classes operated in each day was exactly the same as on similar days in October, 1912. For example, there was one day in 1908 and one day in 1912 when 19 trains were operated; there were four days in 1908 and in 1912 when 20 trains were run, and so on, the greatest number of trains operated in one day being 25 in each case. The total number of trains handled during these 20 days was 439 in each year, an average of 21.95 trains per day. The number of passenger trains operated during the period was 4 each way, or a total of 8 a day.

Three classes of engines were used in freight service during the period under discussion; the Class T engine with a wheelbase rating of 1,500 tons; the Class V engine with a wheelbase rating of 2,200 tons, and the Class V-4 engine with a wheelbase rating of 2,800 tons. The eastbound rating for all engines was the car limit of 75 cars.

In 1908, 27.3 per cent of the trains were headed by Class T, 53.5 per cent by Class V, and 19.2 per cent by Class V-4 engines. In 1909 the distribution of engines was 4 per cent Class T engines, 94 per cent Class V engines and only 2 per cent Class V-4 engines. In 1912 no Class T engines were used, 83.3 per cent of the trains were headed by Class V engines and 16.7 per cent by Class V-4 engines. The average percentage of loading of all engines in 1908 was 62.5 per cent, in 1909 69.4 per cent, and in 1912 68.8 per cent.

As a basis for the comparison of speeds, the total time consumed by freight trains on the single track portion of the division was taken from the train sheet, the difference between the leaving time for westbound trains at Laurel, which is the end of double track, and the arriving time at Livingston, which includes all stops and delays, being used for arriving at the average speed of westbound trains. For eastbound trains, the difference between the time of leaving Livingston and arriving at Laurel was used in determining their average speed.

In 1908, during the 20 days which are used for comparison, 256 freight trains were operated. The total time consumed by these trains on the single track portion of the division was 2,088 hours and 28 minutes. The average time, therefore, for both east and west bound freight trains during this period in 1908 was 8 hours and 9 minutes, or an average of 12.3 miles an hour. In 1909 225 freight trains were operated in both directions, and the time which they consumed on the single track was 1,819 hours and 25 minutes, or an average for each train of 8 hours and 5 minutes, making an average speed of 12.43 miles an hour. In 1912 239 freight trains were operated. They consumed 1,655 hours and 51 minutes on the single track portion of the line, or an average time of 6 hours and 56

minutes a train, which made an average speed of 14.47 miles an hour.

#### Possible Savings Effected by Signals

In order to show the saving in railroad equipment that would be effected by the universal use of automatic block signals, reference is made to the table on freight traffic of steam railways in the United States for 9 months, April to December, 1917, inclusive, which appeared in the Railway Age of April 5, 1919, page 906. From this table, covering a period of 273 days, the following information is deduced:

Freight train miles..... 495,253,718  
Freight train miles (loaded and empty)..... 17,310,224,004  
Average miles of track operated..... 2,575,617  
Revenue ton miles..... 385,751,955,137  
Freight cars in service and in shops..... 2,081,144  
Per cent of freight locomotives in shops..... 13.9  
Per cent of freight cars in shops..... 17.7

From the above the following is deduced:

Average freight train miles a day..... 1,801,031  
Average freight train miles per freight locomotive a day..... 50.47  
Average miles per train..... 34.9  
Average trains a day..... 7.91  
Average miles per car a day..... 1,394,552.210  
Average revenue ton miles per freight locomotive per car mile a day..... 30.91  
Average revenue ton miles per freight locomotive per car mile per day..... 62,966,309  
Average revenue ton miles per freight car per car mile a day..... 25.3  
Average revenue ton miles per freight car per car mile per day..... 445  
Per cent of freight locomotives available for service..... 86.1  
Per cent of freight cars available for service..... 82.3

There is approximately 300,000 miles of main line track in the United States. If the block signal report of the Interstate Commerce Commission, dated January 1, 1918, is taken as the basis, it is found that the total amount of track equipped with automatic block signals amounts to 57,083, or 19 per cent of the total miles of track. This leaves that is not equipped with main line track in the United States 242,917 miles of main line track.

It is recognized that the automatic block system has many advantages over other methods of blocking trains and installations have demonstrated their ability to expedite traffic time after time. By their use numerous delays are eliminated and trains are enabled to cover the distance between terminal points in a shorter length of time, which frequently enables them to haul a heavier tonnage. The effect of a little saving in time on the schedule of one train may appear to be a small matter, but in the aggregate this saving calculated amounts to considerable.

Some of the results obtained from the use of signals were given in the article by Henry M. Sperry on "Train Operation by Signal Indication on the Erie," which appeared in the Railway Signal Engineer, July, 1918. As pointed out in that article, a saving of 1 hour and 40 minutes was made on one division of the Erie after the installation of signals.

In order to determine what this saving in time will amount to on the average road it is necessary to make some assumptions based on facts made from previous studies. Applying 15 miles to the miles of track at present unequipped we deduce the following:





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In 1904 the American Locomotive Company built the first Mallet locomotive in the United States. This design included a power reverse gear. We have been building power reverse gears ever since.

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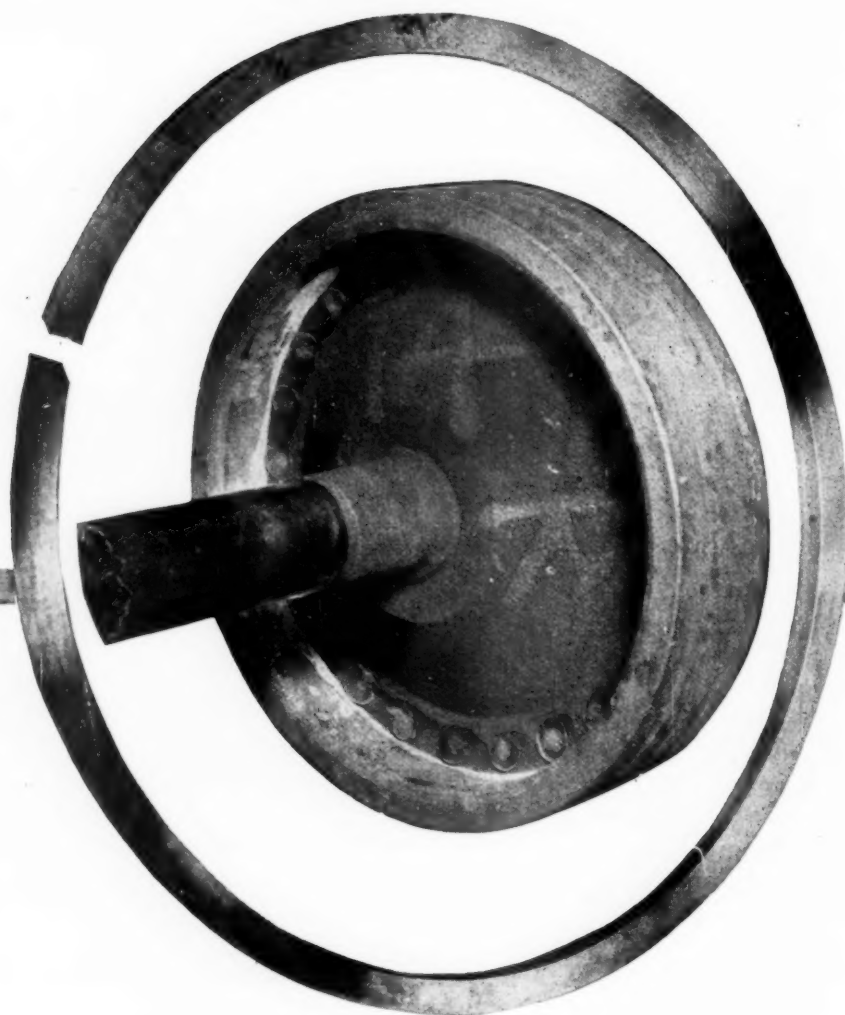
The crosshead on our gear is supported by very rigid guides. We believe that these guides are necessary in order to avoid trouble with the piston rod packing.

Both sides of the piston of our gear are constantly under pressure when gear is at rest. Movement of the gear is obtained by exhausting the required amount of air from one side of the piston. In this way air consumption is kept at a minimum, as the only air required for each movement is the equivalent of the amount exhausted.

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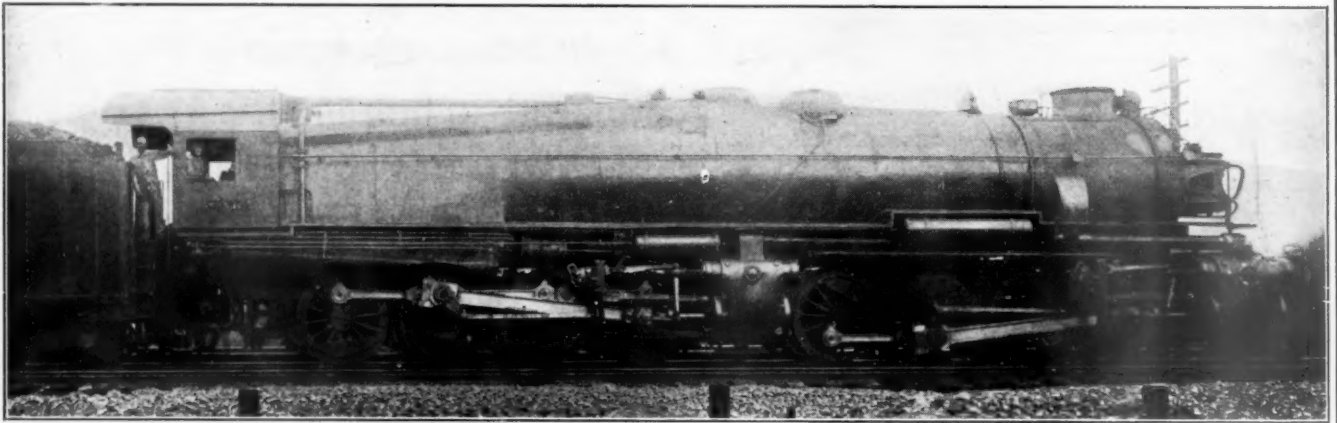
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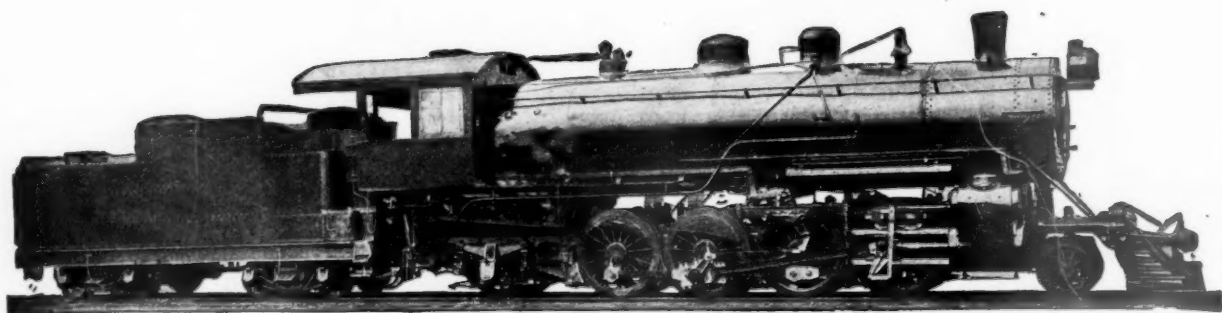
For every use of flexible joints — Roundhouse Blower and Blowoff Lines, Boiler Washing Sets, Engine-Tender Connections for Steam, Oil and Air, Car All-Metal Steam Heat and Air Connections, Terminal and Coach Yard All-Metal Steam Heat and Air Connections — you will find a BARCO JOINT specially adapted for the purpose, though parts and gaskets are standard and interchangeable.

The diversity of types insures maximum life with minimum repair—because these types are designed to efficiently meet the widely varying requirements of the different uses. The result:—Every joint gives 100% service for the purpose intended. Let us give you further particulars.

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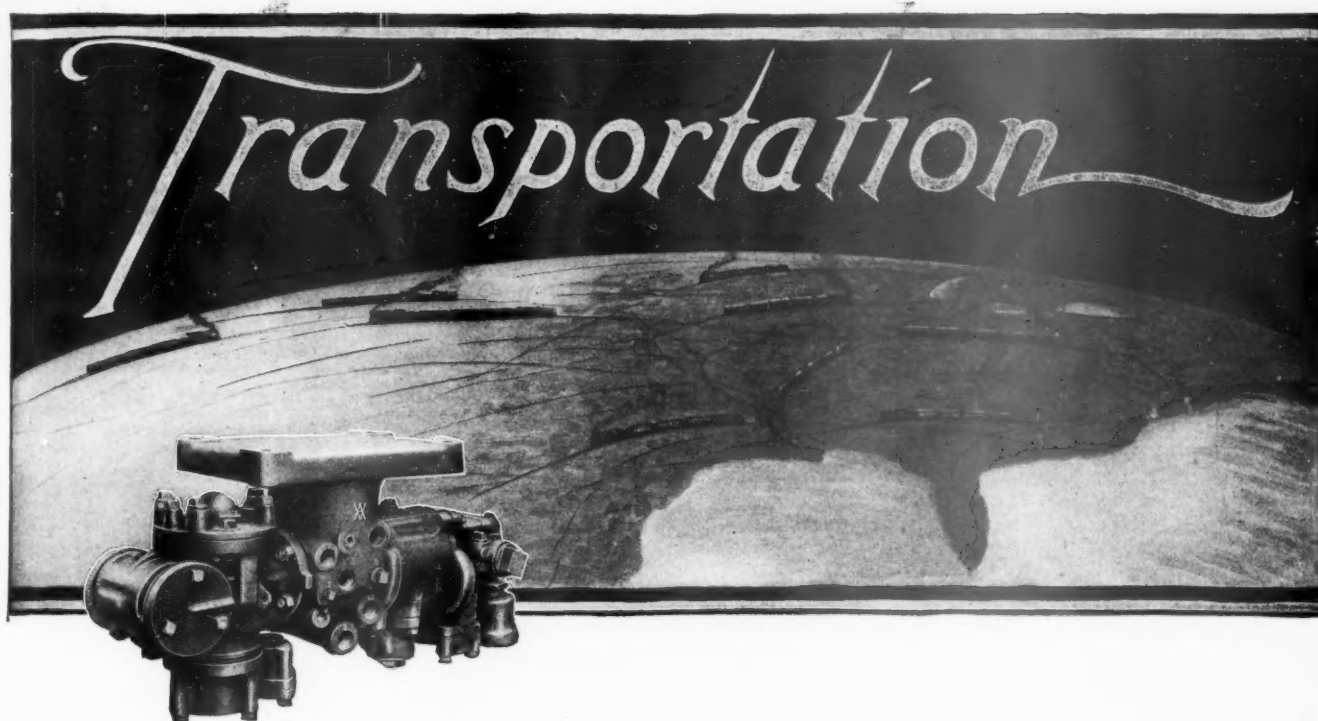
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Your engines haul more tonnage at lower fuel and repair costs—when the piston rod and valve stem packing is King Metallic.

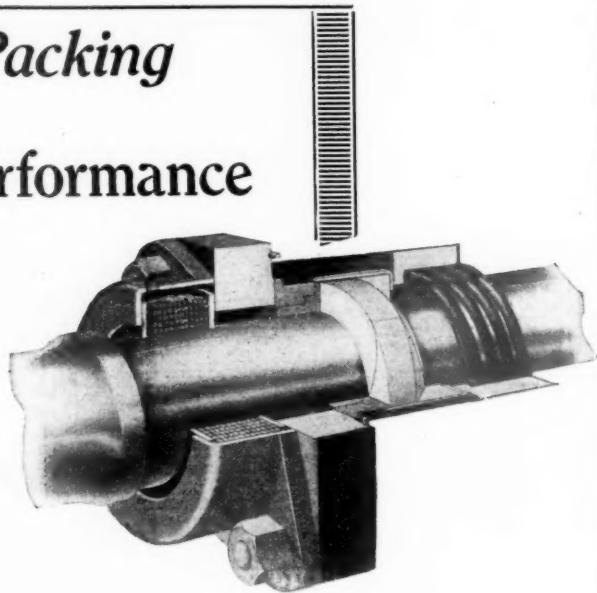
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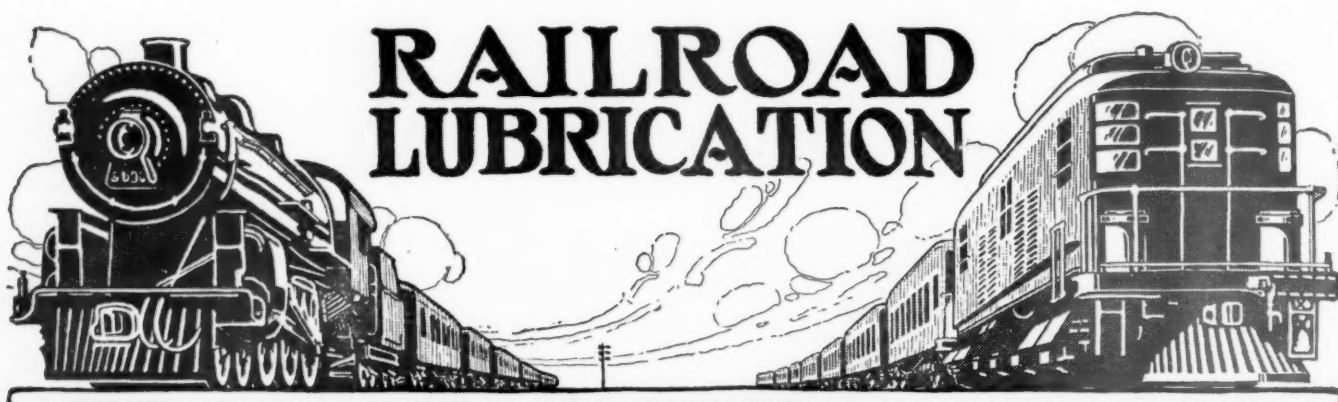
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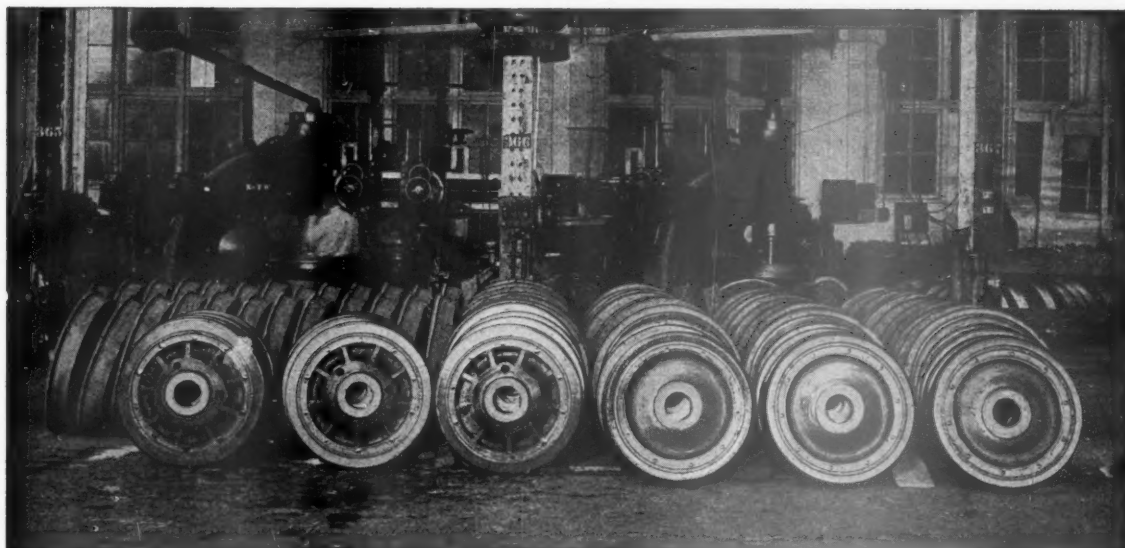
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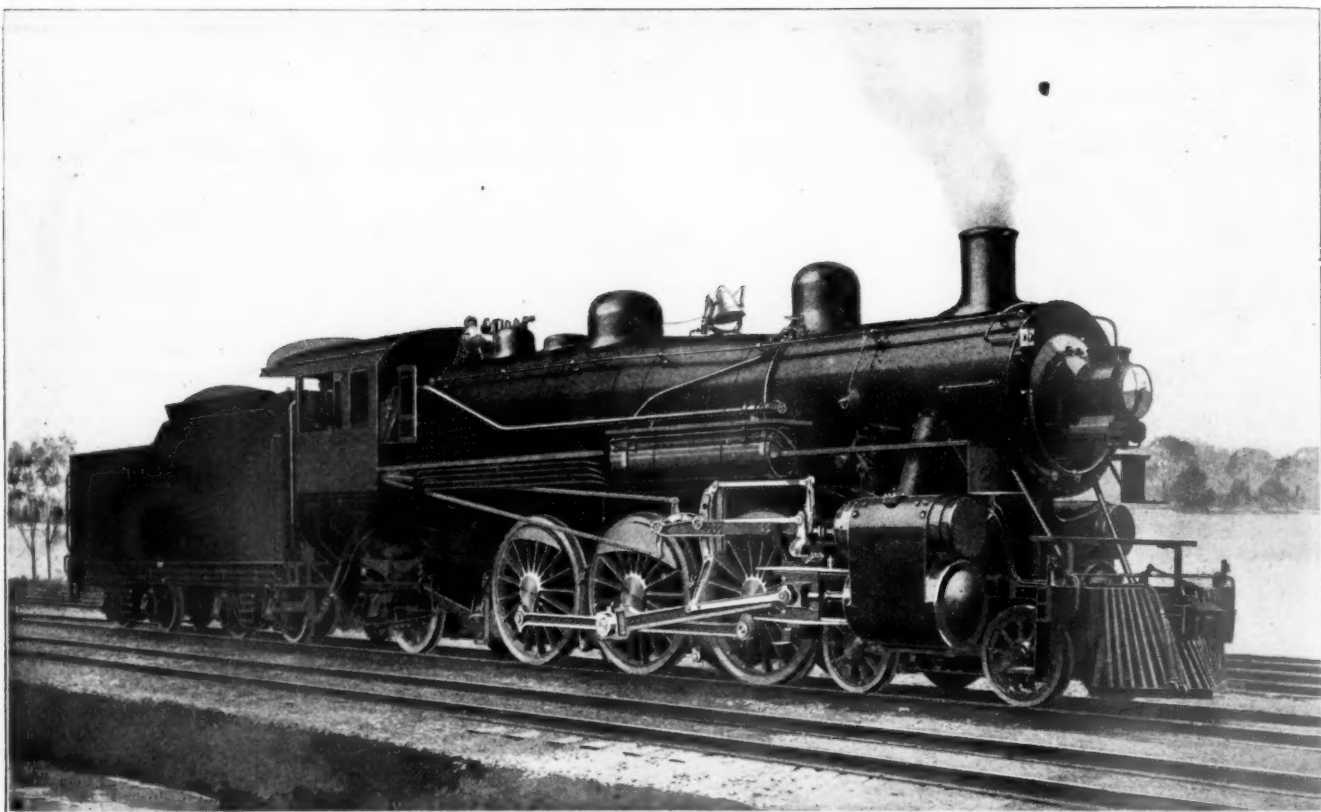


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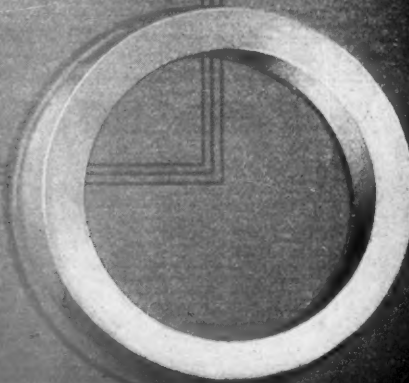
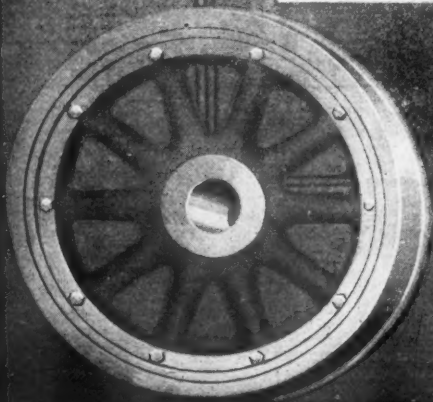
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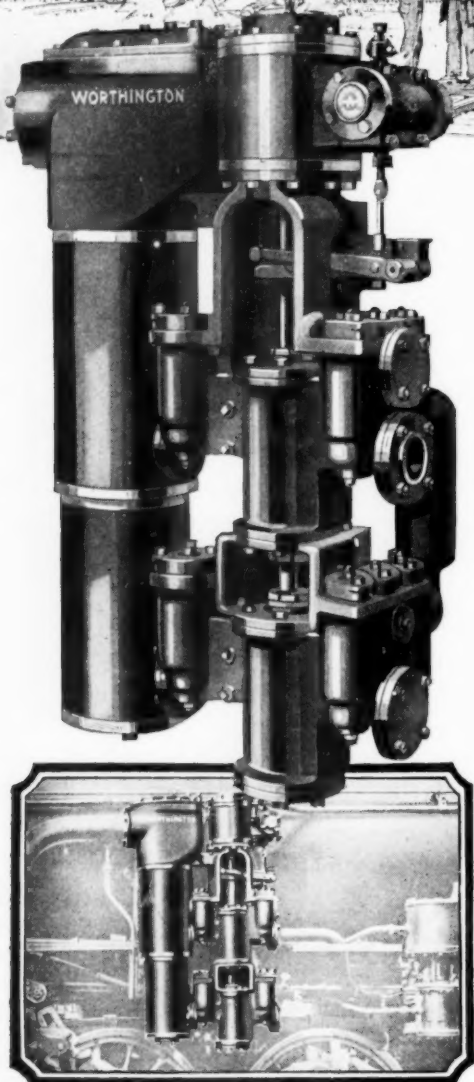
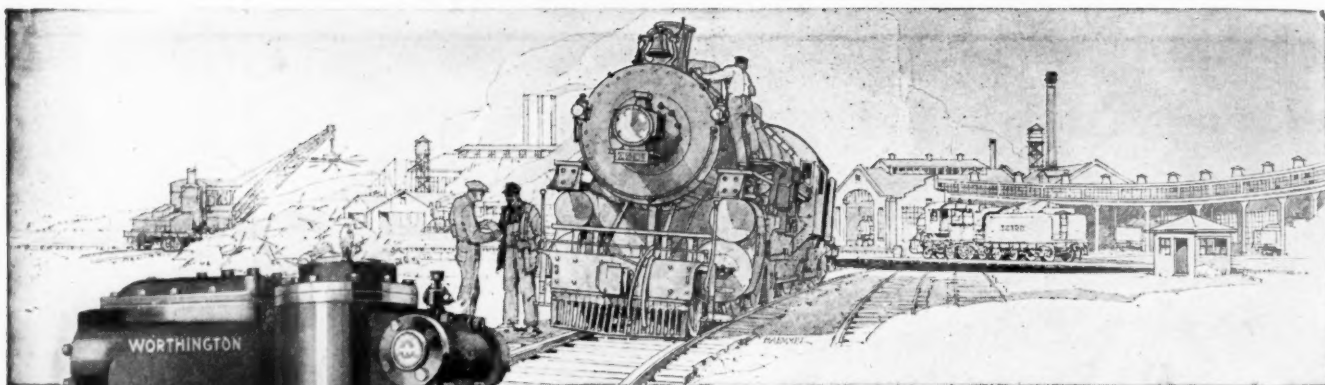
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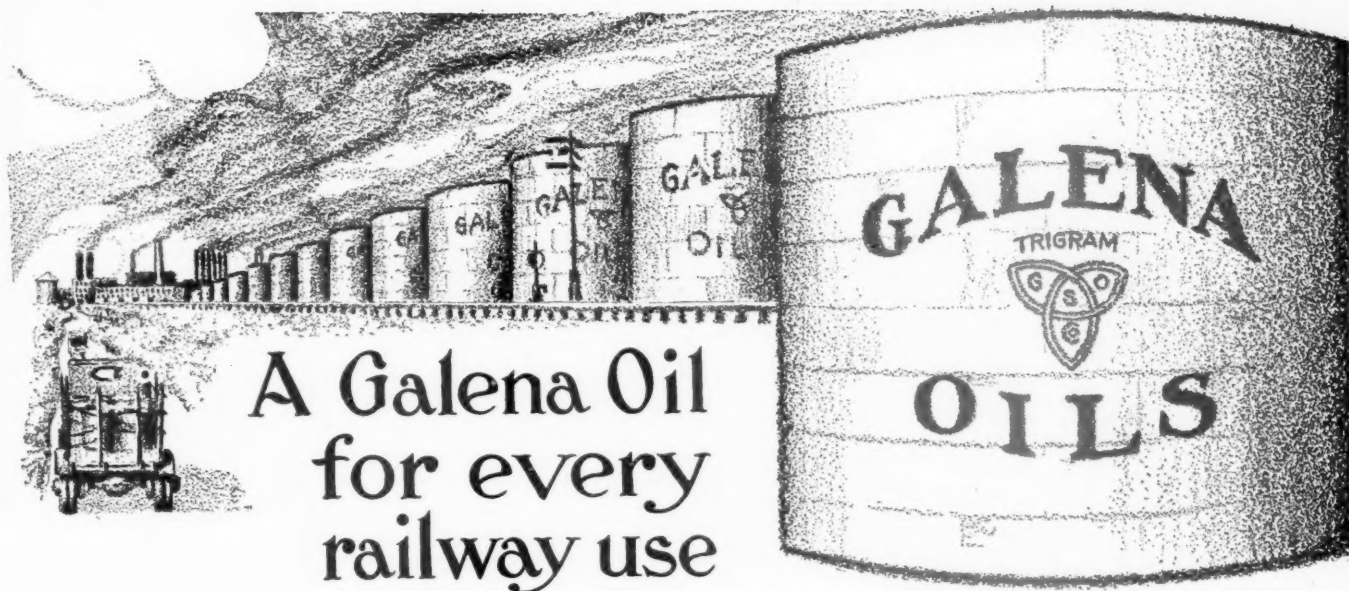
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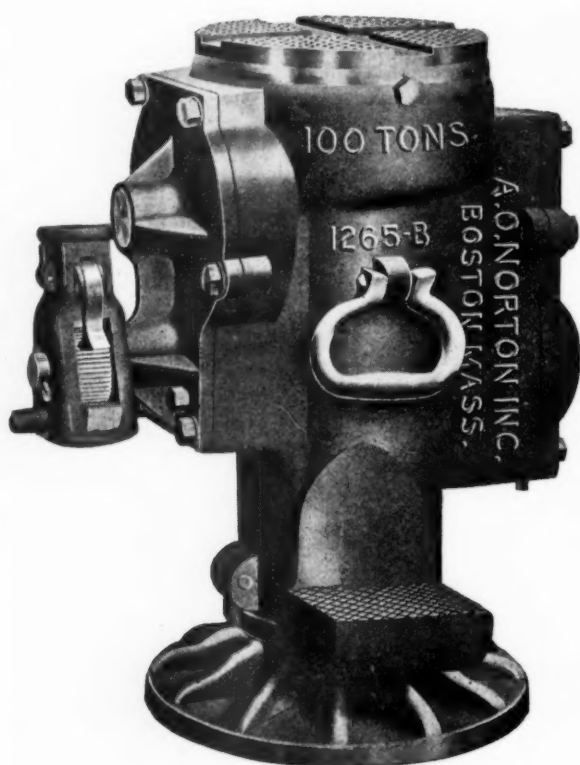
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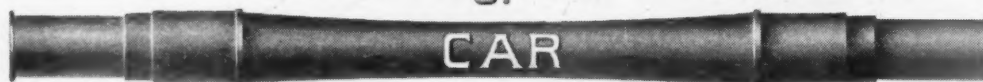
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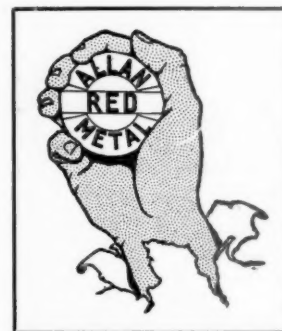
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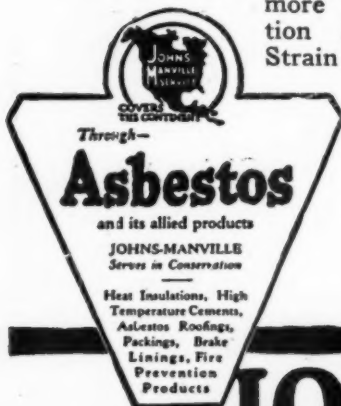


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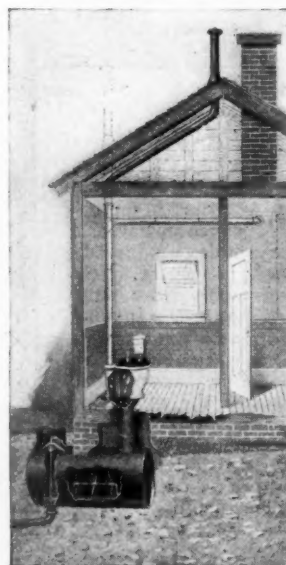
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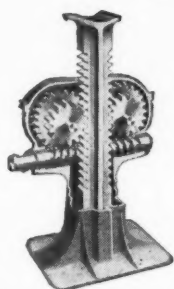
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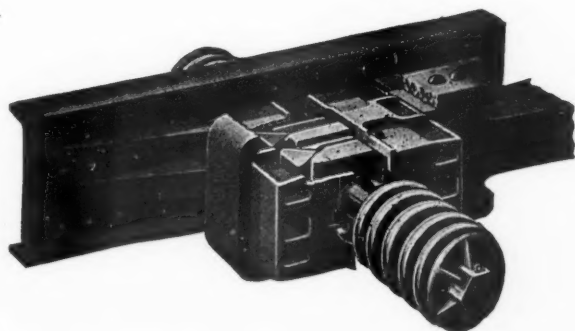


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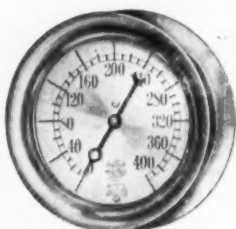
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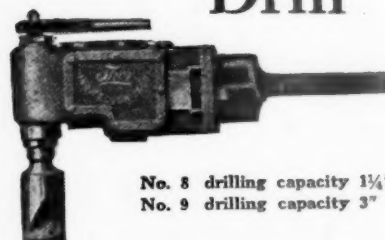
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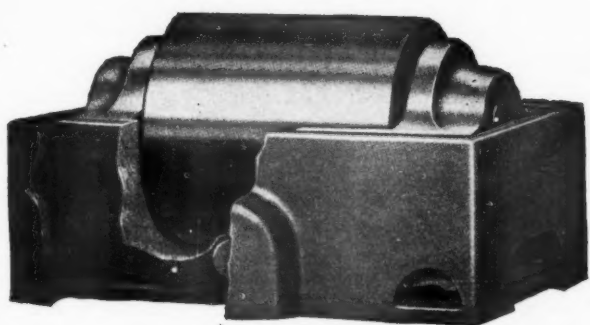
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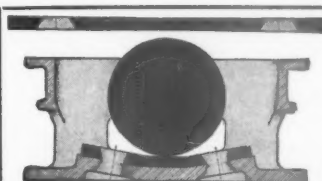
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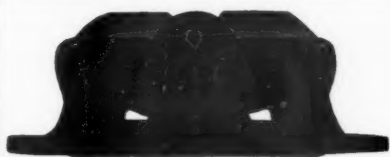
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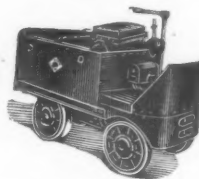
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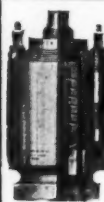
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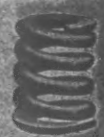
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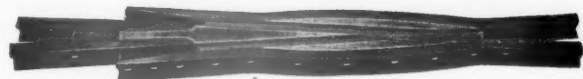
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50 East 42nd St., New York City

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Feasible Drop Brake Staffs  
Anglo-American Varnishes,  
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prevents wear and cutting of Shoes, Wedges, Hub Liners, etc., because of the graphite veneer imparted by this grease. Write for sample and Circular No. 105-HR.

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Pulverizer Mills, Crushers, Dryers, Furnace Feeders.

The satisfactory performance of Fuller-Lehigh equipment warrants your investigation. Ask for Catalogue No. 105.

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**KELLER PNEUMATIC TOOL CO.**  
FACTORY: GRAND HAVEN, MICHIGAN, U.S.A.

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OFFICE AND WORKS: RANKIN, PA. WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.

### AMERICAN Balance, SEMI-PLUG Piston and JACK WILSON

High Pressure Slide Valves and Packing Rings.

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A Century's Experience  
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Iron Rivets, Engine Bolt Iron, Staybolt Iron  
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Unusual Facilities For Prompt Shipment  
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"Advertising is intensive salesmanship. It is the modern method of scientific, economic distribution, and anything which tends to facilitate distribution—the most serious problem of merchandising—is not and cannot be extravagance, any more than a machine which costs \$5,000, but pays for itself in a year, could be considered a waste." Excerpt—Who Pays the Advertising Bills.

**Classified Advertisements—Help and Situations Wanted** advertisements appearing in the "Get Together Department," 5c. a word for the first insertion and 3c. a word for each following consecutive insertion. **Minimum charge \$1.00 for each insertion.** For Sale advertisements, \$3.00 a column inch (1 1/8" wide). Any number of inches may be used. Copy must be in this office by Saturday noon to insure insertion in the following week's issue.

### POSITION OPEN

**WANTED** — Experienced office man or Sales Manager, familiar with Railroad equipment and supplies. Give particulars. Address Box No. 112, Railway Age, Woolworth Building, New York, N. Y.

**WANTED:** Designer and draftsman experienced in track material. Submit full information with sample of drawing and state salary expected. Hayes Track Appliance Company, Richmond, Indiana.

**CLERICAL** man for office of Master Mechanic and Supt. of Motive Power. Must be first class man. State age and dependents. Good position. Clark Halre, Gen. Supt., Boyne City, Gaylord and Alpena R. R. Co.

**WANTED**—By a southern railroad, an assistant auditor experienced in general accounts. Address, stating age, business history and salary expected, Box 102, Railway Age, Woolworth Bldg., New York, N. Y.

### POSITION OPEN

**WANTED**—Mechanical Engineer with a couple of years' railroad shop experience, preferably with knowledge of oil burning locomotives and Spanish. State qualifications and record of experience fully in first letter. Location, Cuba. Box No. 97, Railway Age, Woolworth Bldg., New York, N. Y.

**WANTED** by General Auditor large transcontinental Railroad, headquarters out of city, Railroad Accountants experienced in either Disbursements, Miscellaneous, Station or General Balance Sheet Accounts or in Operating Statistics. Applicants should state age, experience, present position, salary and employer, and salary expected. Address: Box 104, Railway Age, Woolworth Building, New York.

**IF ACTUALLY QUALIFIED** for salary between \$2,500 and \$25,000 communicate with undersigned, who will negotiate strictly confidential preliminaries for such positions; executive, administrative, technical, professional; all lines. Not an employment agency, undersigned acts in direct confidential capacity, not jeopardizing present connections. Established 1910. Send name and address only for explanatory details. R. W. Bixby, Inc., 302 Lockwood Bldg., Buffalo, N. Y.

### POSITION WANTED

**TRANSPORTATION** man of 15 years' experience—now chief clerk to superintendent on very heavy division, wants position of assistant superintendent, trainmaster or chief clerk. Best of reference. Box 110 Railway Age, Woolworth Bldg., New York, N. Y.

**HAVING** severed my connection of twenty years with one of the largest railroad and manufacturing supply houses in Philadelphia, am now free to act as agent or representative for any line that requires a broad acquaintance among railroad and manufacturing industries. Have my own office. If you require a Philadelphia representative, address Box 72, Railway Age, Woolworth Building, New York.

**SALES POSITION WANTED**—Man with sales experience familiar in general way with car and locomotive appliances. Extensive acquaintance with purchasing and mechanical departments in West, Northwest and Southwest territories. Nominal salary and commission basis preferred. Address W. H. H., 1014 Central National Bank Bldg., St. Louis, Mo.

### POSITION WANTED

**EXPERIENCED** Railroad Mechanical Engineer desires change. Fifteen years in charge of locomotive and car engineering and improvement work. Experienced in shop operation. Now employed. Graduate engineer. Box 109, Railway Age, Woolworth Bldg., New York.

**EXPERIENCED** Railroad clerk and accountant, 25, now employed, would like change. Have had nine years' experience in all Departments of railroad work and can handle any clerical position offered. Best of references. Address Box 103, Railway Age.

### EDUCATIONAL

**THOSE** interested in increasing their knowledge of practical railroad work should send for our Free Special Bulletin, describing our instructional methods. \$1.50 per month covers all expense for text books, instruction, etc. Investigate this opportunity to increase your earning capacity. The Railway Educational Bureau, Omaha, Neb.

## Point of Contact

**H**AVE you ever tried to analyze your product as to its advertising possibilities? Have you ever gone deep down into its sales possibilities to find the "point of contact" between it and its possible buyers?

Often the "point of contact" is hard to find, for it is always the obvious that escapes us.

If a product or device makes for economy, savings, etc., obviously the point of contact is along these lines—but your message should be so placed before the maintenance of way man that your appeal comes within his experience.

Our copy-service department may be able to assist you in establishing the correct point of contact.

Call upon us to assist you whenever you feel that your copy-plan needs the viewpoint of the man outside

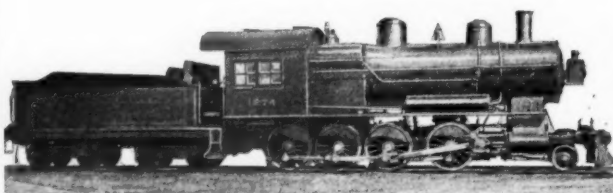
## Railway Age





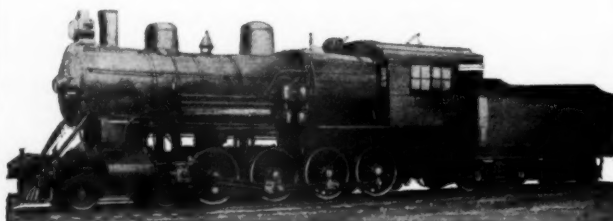
1580 CLASS

Have eight, 92 tons, cylinders 21 x 28", Piston Valves,  
200 pounds pressure.



201 CLASS

Have four, 83 tons, cylinders 20 x 26", Piston Valves,  
200 pounds pressure.



1472 CLASS

Have six, 79 tons, cylinders 20 x 26", Piston Valves,  
200 pounds pressure.

Can make immediate delivery of either class offered above, and if interested telegraph us and will mail complete specifications, photographs and prices.

Also have other locomotives narrow and standard gauge, various types. Have in stock steam shovels 1¼ to 4 yard dippers.

**SOUTHERN IRON & EQUIPMENT CO.**  
Atlanta, Georgia

## WARNING

### Rail Users

If you contemplate needing more track **BUY NOW**. There is a Scarcity. We own and offer the following **NEW RAILS** for prompt shipment:

80 lb. Rails, angle bars, bolts, nuts and spikes.  
90 lb. " " " " " " " "

They will be gone soon. Write or wire for our quotations.

Also approximately 4,000 tons 70 lb. No. 1 re-layers, webber joints.

**HYMAN-MICHAELS CO.**

531 Peoples Gas Bldg.,  
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New York City

## RAILS

### NEW

1500 tons 90 lb.  
500 tons 85 lb.  
500 tons 80 lb.  
200 tons 75 lb.  
300 tons 70 lb.  
300 tons 65 lb.  
200 tons 60 lb.

### RELAY

250 tons 60 lb.  
200 tons 50 lb.  
400 tons 45 lb.  
400 tons 30 lb.  
400 tons 20 lb.

Good Stock—Immediate Shipments. New and Used Switch Material, Spikes, Bolts, Tie Plates, Rail Braces, Angle Bars, Ties, etc.

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Get our 140 page Bulletin for unusually good bargains in Rails, Cars, Locomotives, Engines, Boilers, Machine Tools, Pipe, Piling, Tanks, etc.

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Milwaukee, Wisconsin

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**Manufacturers of  
Steel Freight Cars**

**Shops at Hammond, Ind.**

Located on B. & O. C. T. R. R.,  
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**We Build Steel Underframes  
Steel Freight Cars Repaired and Rebuilt  
We Manufacture Tank Cars for Sale or Lease**

Prepared to furnish on short notice tank car specialties and repair parts, standard to various types of cars.

## ATTENTION!

Having just purchased from the United States Government, can offer you the following new track material at very exceptional prices.

75,000 tie plates, 6½ x 10,  
for 80 lb. rail.

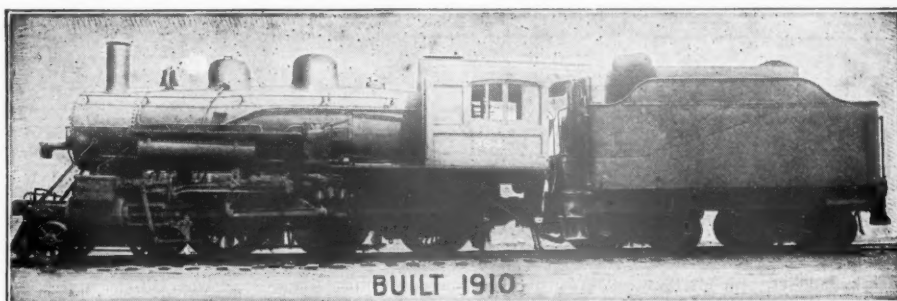
150,000 pieces of rail braces  
for same type rail.

86,000 pair angle bars, 80  
lb. rail, drilling 6 x 6 x 6.

The above material located at  
Norfolk, Va.; Kearny, N. J.,  
and Chicago, Ill.

All new, first quality steel,  
ready for immediate shipment.

**M. K. FRANK**  
Frick Bldg., Pittsburgh, Pa.



## Rails

**LOCOMOTIVES**, all types. **COACHES—FREIGHT CARS**, new and used. **NEW CABOOSES** with steel center sills.

All our equipment is in **FIRST CLASS** condition and **PROMPT DELIVERIES** assured.

**WE** are **EXPORTERS** in the market for railroad equipment of all kinds.

**GRAY & SON, Inc.**

122 S. Michigan Avenue, Chicago, U. S. A.

WILLIS E. GRAY, President.

1

**GENERAL ELECTRIC** Gas  
Electric Motor Car. Length  
66 ft. 7 inches, four compart-  
ments; engine room, baggage  
room, smoking room, and main  
passenger compartment seating  
60 persons. Steel underframe  
and steel body, equipped Baker  
heater, toilet, wash room, etc.  
Gasoline engine. Recently over-  
hauled. In first class working  
condition. Surplus car, reason  
for selling. Box No. 110, Rail-  
way Age, Woolworth Bldg.,  
N. Y.

## PRIVATE CAR WANTED

**WANTED**—Used steel under-  
frame private car—submit  
specifications, diagram and price,  
with advice as to condition and  
inspection point to Box 111,  
Railway Age, Woolworth Bldg.,  
New York, N. Y.

## FOR SALE RAILWAY EQUIPMENT

*Correspondence Solicited*

**THE MALES CO.**

39 Cortlandt St., New York City

## 40 lb. T Rail

About 1800 tons, with angle bars. First-class  
relayers.

Several 36-in. gauge Mogul and eight-wheel  
American type locomotives, sixty-three freight  
cars of various types, four passenger cars.

Details and prices on request.

**E. H. WILSON & COMPANY**

**COMMERCIAL TRUST BUILDING  
PHILADELPHIA**

## Dump Cars Wanted

Second hand 30 to 36 cubic yard water level  
capacity all steel side dump cars of type manu-  
factured by the Western Wheeled Scraper Com-  
pany.

Send price and details to

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The *Get Together Department* is the show  
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### ENGINEERS—CONSTRUCTORS

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Specialists in the planning of railroad properties and their construction. Offering complete service from conception to operation, eliminating hazardous division of responsibility and insuring maximum economy.

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Inspecting Engineers. Inspection of Bridges, Building Materials, Railway Equipment, Cement, Pipe, Machinery, etc. Examinations, Consultations, Appraisements, Physical and Chemical Laboratories.  
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Our complete and experienced organization is at your service for the design and construction of railway structures of every character.

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Design and Construction of Bridge and Structural Work  
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**Railway and Industrial Engineers Incorporated**  
Investigations, Inventories and Valuations  
Specialists in Railway and Industrial Facilities and Equipment  
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**Bush, Roberts and Schaefer Co.**  
Engineers and Contractors  
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Reinforced concrete viaducts, track elevation work, railroad terminals, piers, docks, general civil engineering and construction work.

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General Engineering  
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Industrial Plants and Buildings  
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NEW YORK BOSTON CHICAGO

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Consulting Mechanical Engineer  
Special attention given to Shop Designing and to the Designing, Testing and Constructing of Railroad Machinery and Rolling Stock. Self-feeding Track Drills

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You are reading this. Place your name here and others will read your message.

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Inst. Can. Consulting Civil Engineer.  
**BRIDGES, FOUNDATIONS**  
Reinforcement of Long Spans a Specialty.  
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SPECIALTIES: Railroad Investigations, Motive Power, Railway Equipment, Power Plants, Mechanical Facilities, Tools and Supplies. **INSPECTION OF Materials, Processes, Structures, Locomotives, Cars, Rails.**  
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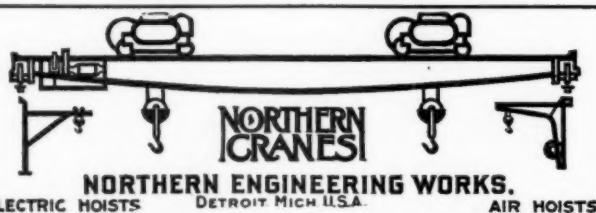
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2065-75 Railway Exchange, St. Louis, Mo., Chicago, Kansas City.  
Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Docks, Water Supply, River and Flood Protection, Drainage and Sanitation, Naval Architecture.

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If you have second hand equipment for sale your advertisement should appear in the

**"Get Together  
Department"**

TRY IT



# *New and Never Used* **Western Air Dump Cars**

**Standard Gauge**

**U. S. Safety Appliances**

These cars comprise the entire lot of U. S. Government cars of this size and type ordered during the War and not completed until March, 1919



## **20-yd. All Steel Cars**

Built by Western Wheeled Scraper Co., Aurora, Ill., to following specifications:

Gauge of track: 4 ft. 8½ in.  
Length of body, inside: 26 ft.  
Width of body, inside: 9 ft.  
Height of body, inside: 2 ft. 4 in.  
Height of body above rails: 8 ft. 3 in.  
Center to center of trucks: 16 ft. 8 in.  
Truck capacity: 80,000 pounds.  
Journals: M. C. B. 5 in. by 9 in.  
Draft gear: "Farlow" type with Class "G" springs.

Locking device: Western Wheeled Scraper Company's "Chain" type.

Construction: Steel throughout.

Safety appliances: United States standard.

Special equipment: Two 20-inch vertical dumping cylinders and two train lines for operation of dumping mechanism.

Located: Chicago, Ill., and Jeffersonville, Ind.

## **16-yd. Composite Type Cars**

All Steel construction except wooden bed. Built by Western Wheeled Scraper Co., to following specifications:

Gauge of track: 4 ft. 8½ in.  
Length of body, inside: 26 ft.  
Width of body, inside: 9 ft.  
Height of body, inside: 2 ft.  
Height of body above rails: 7 ft. 11 in.  
Center to center of trucks: 18 ft.  
Truck capacity: 60,000 pounds.  
Journals: M. C. B. 4¼ in. by 8 in.

Catalogue reference: Western Wheeled Scraper Company's Code —"Atwist."

Construction: Composite type, "all-steel" except wooden bed.

Safety appliances: United States standard.

Special equipment: Two horizontal cylinders and two train lines for operation of dumping mechanism.

Located: Norfolk, Va.

## **Immediate Delivery**

*Cars priced at big saving over present factory prices*

# **CLAPP, NORSTROM & RILEY**

**14 South Canal Street, Chicago, Ill.**



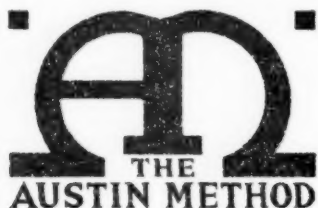
Engine terminal built and equipped for the Toledo & Ohio Central Railroad at Columbus, Ohio.



Interior view of a six engine rectangular house built and equipped for the Chesapeake & Ohio Railway, Newport News, Va.



Exterior view of the engine terminal built and equipped for the Raritan River Railroad, South Amboy, N. J.

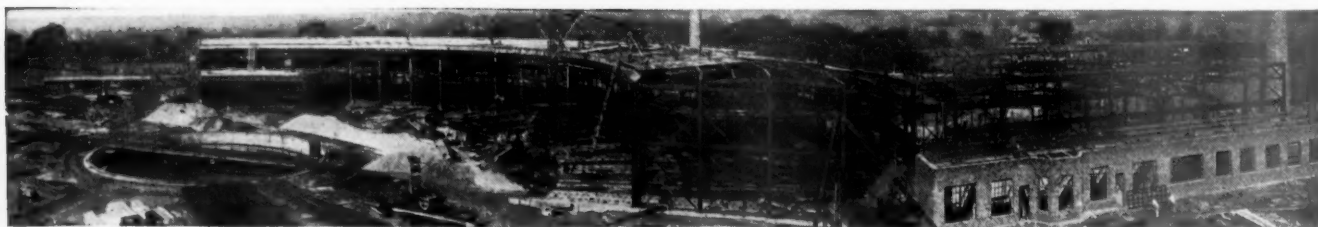


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The Austin Company has been employed on practically every type and character of engine house construction, from the simplest to the most complex.

All the Austin-built examples illustrated have brick walls with steel sash; the framing and roof construction is wood in some cases and reinforced concrete in others. Whether structures are built of steel, timber or reinforced concrete we have experienced men to handle the engineering and construction work.

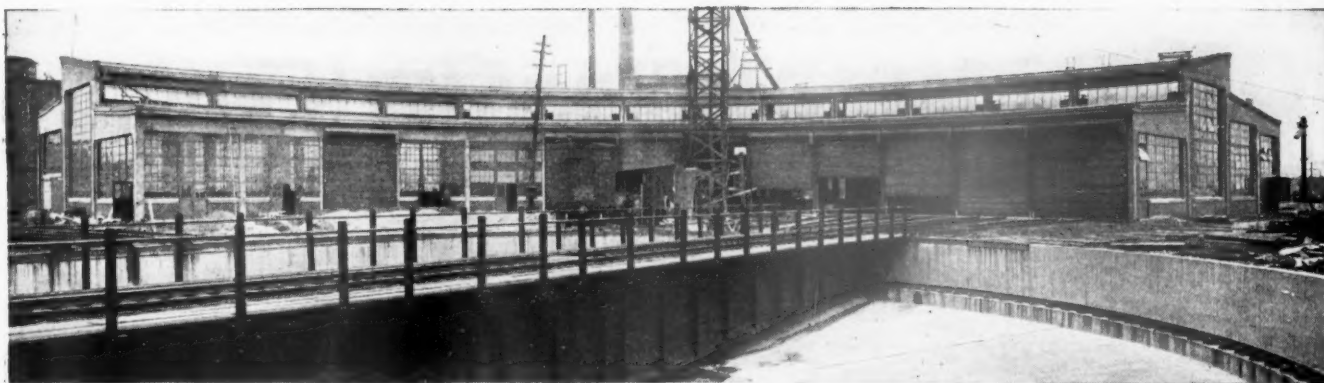
Labor and material scarcity, increased costs due to general inefficiency, have tended to limit construction work. These hindrances, however, are largely precluded by the Austin Method—a service which embraces an engineering and construction organization trained in overcoming obstacles. Working drawings and the assembling of men and materials, move forward with dispatch.



General construction view of engine house and machine shop built and equipped for the Pennsylvania Lines West at Richmond, Ind.

# AUSTIN

## STANDARD RAILWAY-BUILDINGS



Exterior of roundhouse built and equipped for the Philadelphia & Reading Railway at Philadelphia, Pa.

## Versatility

If you need engineering, an experienced organization is ready and able to serve you promptly and efficiently. If you have your own plans, we are ready to undertake construction only. Austin can execute with dispatch. Austin specialists are prepared to lay out and install all electrical and mechanical equipment work for an engine terminal—no profit pyramiding through sub-contracts for this or any portion of our construction work.

You can arrange for a conference, without obligation. Write—wire—or phone. Send for the Austin Book of Railway Buildings and Equipment.

### THE AUSTIN COMPANY, Cleveland, Ohio *Industrial Engineers and Builders*

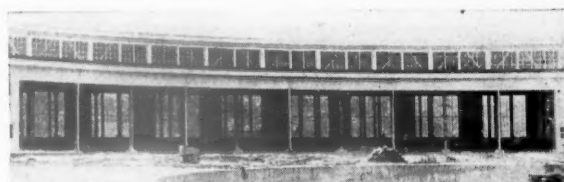
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*Export Representatives:* International Steel Corporation,  
51 Chambers Street, New York City



Rectangular reinforced concrete engine house designed and built for the Long Island Railroad, Long Island City, N. Y.



Ten stall engine house built and equipped for the Hocking Valley Railroad at Nelsonville, Ohio.

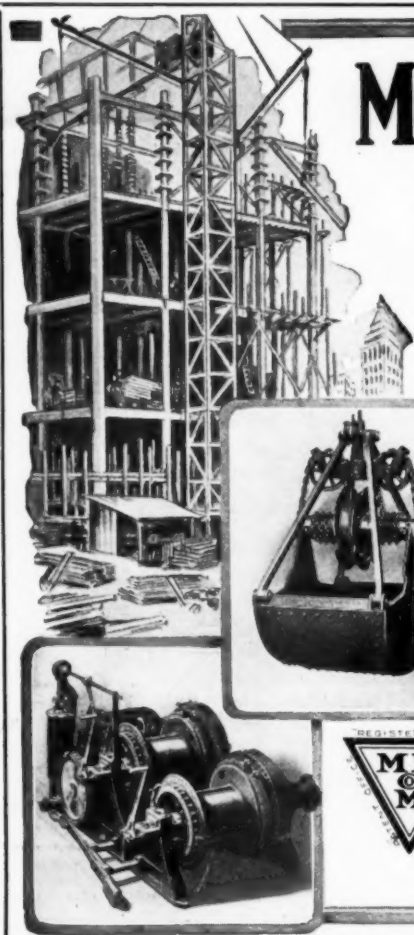


Thirty stall engine house and complete terminal built and equipped for the Pennsylvania Lines at Crestline, Ohio

# AUSTIN

## STANDARD FACTORY-BUILDINGS





## MEAD-MORRISON SERVICE

### LIFTS THE LOAD OF INDUSTRY

More Productive Hours! To increase the productive hours of the nation's industry is the goal toward which Mead-Morrison engineers are working. That their ideals and their methods are sound, is indisputably shown by their practical success in solving the material handling problems in many lines of industry.

The value of Mead-Morrison equipment to the individual user is made materially greater by this engineering service, which assists in making sure that every piece of equipment is utilized in a way that will bring maximum results at a minimum cost.

Mead-Morrison Engineers are recognized as authority on material handling equipment because of their service to the world of industry in designing, manufacturing and installing labor-saving plants at many of the largest freight terminals, coal and ore docks.

Mead-Morrison products—Hoists, steam or electric; Grab Buckets; Conveyors; Car Pullers and Winches—are recognized equipment for efficient, economical material handling.

**MACHINERY AGENTS:** *If you are handling contracting machinery and would like a complete hoisting line, we have some good territory open. We carry complete stocks of equipment in Boston and Chicago, ready for prompt shipment. Write at once for complete information.*

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### MANUFACTURING COMPANY

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## OHIO

### Locomotive Cranes

*Speed and Safety with  
Perfect Control.*



OHIO LOCOMOTIVE CRANE CO.  
BUCYRUS SPRING STREET OHIO



## KINNEAR

ROLLING AND  
BIFOLDING DOORS  
of  
STEEL AND WOOD

COMPLETE LABELED SERVICE

Our Engineering Department will submit plans or specifications. Write for catalogue.

THE KINNEAR MANUFACTURING CO.

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COPPER STEEL  
Galvanized

# Sheets



Highest in quality and rust resistance. Unequaled for Culverts, Flumes, Tanks, Roofing, Siding, Spouting, and all exposed sheet metal work.

We manufacture Sheet and Tin Mill Products of every description—Black and Galvanized Sheets, Corrugated and Formed Products, Roofing Tin Plates, Etc.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

## Bethlehem Solid Manganese Crossings

Ore to Finished Product



Bethlehem product throughout from manganese ore to finished manganese crossing.

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General Offices: Bethlehem, Pa.

Consolidated Steel Corporation, 165 Broadway, New York City, is the sole exporter of our commercial steel and iron products.

## When You Think of Steel Think of Carnegie

Since 1857 Carnegie Steel Company and its lineal predecessors have manufactured a larger variety of iron and steel sections than any other maker in the United States.

When you buy steel from this company it is backed by proved reputation, prestige, and nearly three-quarters of a century of experience. Careful selection of material, technical skill and conscientious workmanship result in products of unusual merit. Control of manufacture from ore to finished product makes this possible.

'Carnegie' rolled on steel is a guarantee of quality, a guide post for wise buying.

### Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.



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If you are seeking *real* economy, the Vitralite Railway Enamel System is the logical answer. There's a special book — quickly read — that tells all about this improved method of finishing.

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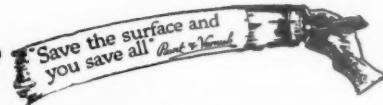
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Culverts because of their enduring qualities and ease of installation.

There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting Armco Culverts and other products of American Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.



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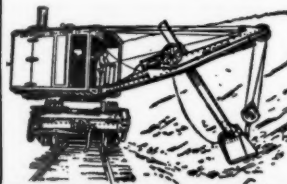


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# BROWNING

It is interesting to note that one of the first things that was done in the development of Hog Island was to get a Browning Locomotive Crane on the job. Other "Brownings" followed rapidly until a large number were in use.



**T**HE illustration shows one of the many Browning Locomotive Cranes put to work on Hog Island in 1918. The brutal, gruelling strain of twenty-four hours a day of feverish, high-speed work was a test of both men and machines. That the Browning Cranes came through with the highest praise is known to all connected with that seething hive of industry.

Browning Locomotive Cranes were chosen for this work because of their known ability to do the widest range of work possible with a locomotive crane. A Browning will successfully handle a bucket for any work that can be done with a bucket. It will also handle a hook block, sling, wood grapple or magnet. In addition to this, a "Browning" may be equipped to handle a drag-line scraper, fitted with a set of pile-driver leads, or converted into a steam shovel of extreme range and high dump.

*Get better acquainted with the "Browning"—write for catalog and work estimates.*

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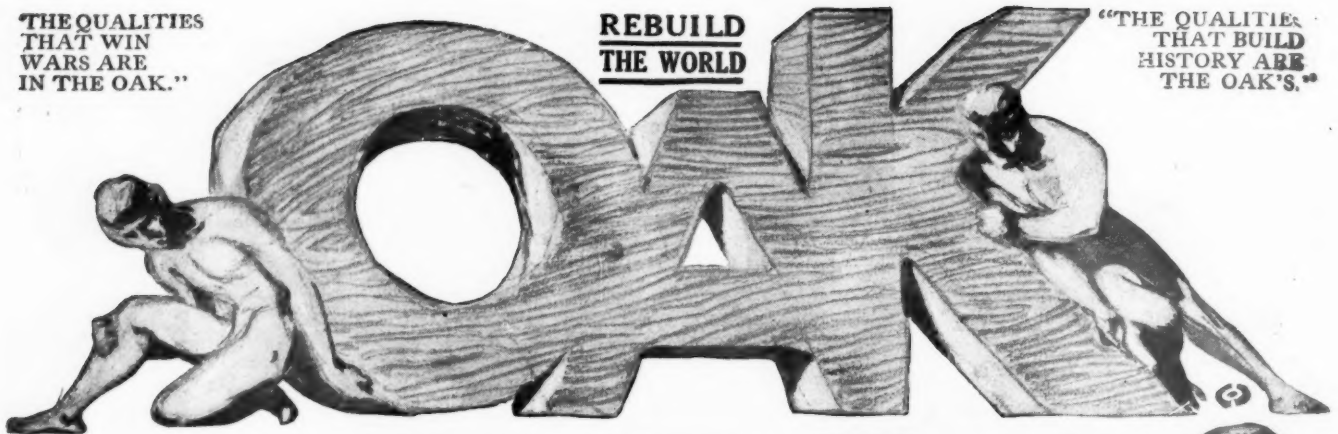
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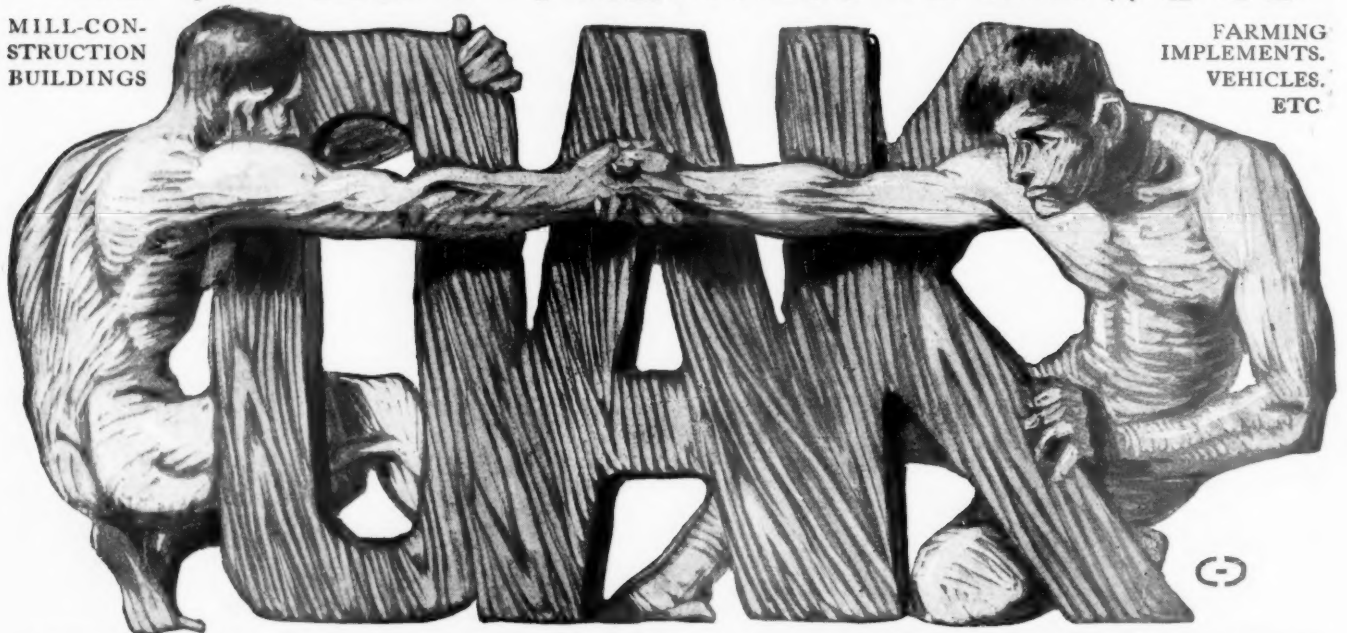
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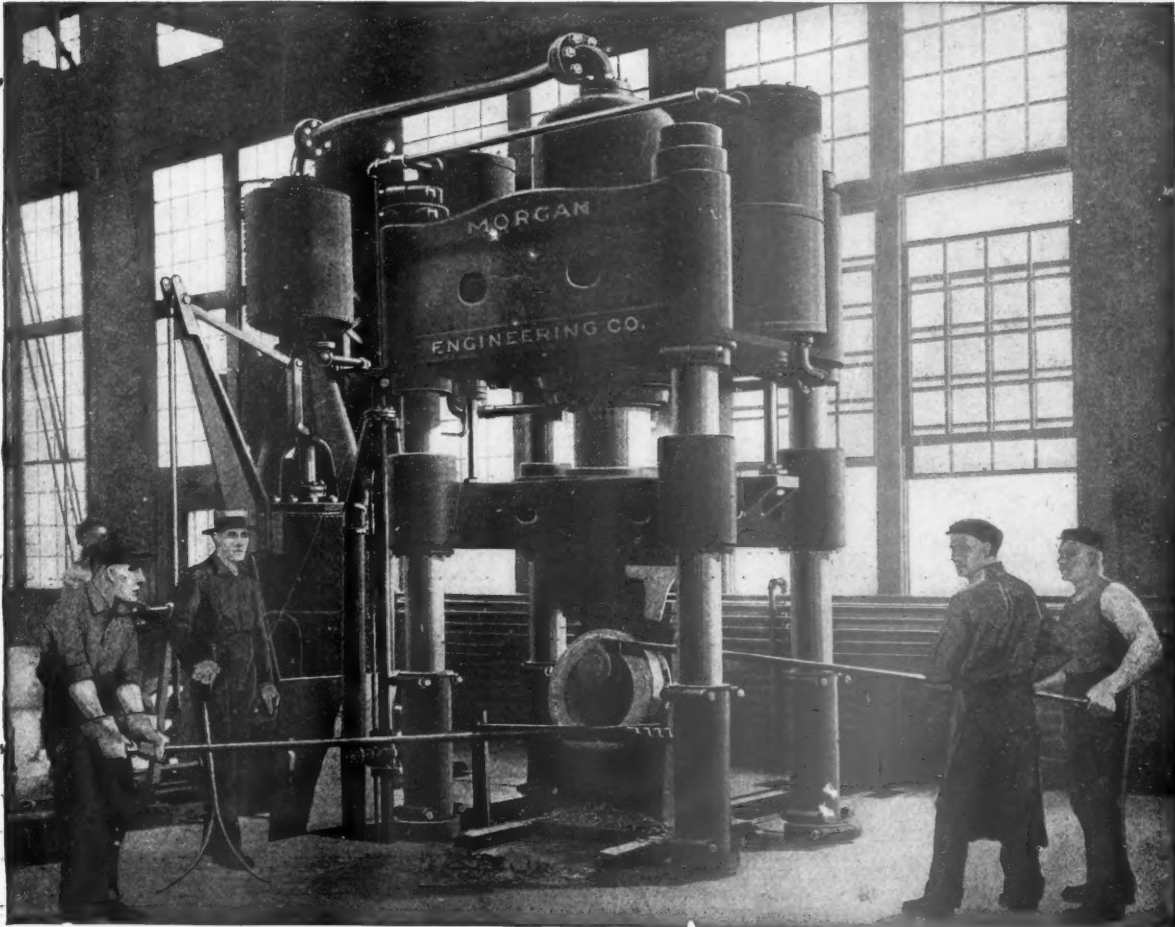
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**Toncan Metal Corrugated Culverts**

It is interesting to know that there is an ever-increasing demand for corrugated culverts made of Toncan Metal.

This fact is significant of the adaptability of Toncan Metal for culvert use. It proves that Toncan Metal is all we claim for it—that it is a super-pure iron having wonderful rust-resisting powers. Thousands of feet of Toncan Metal culverts are now in use under highways and railroads in this country and Canada. The condition of any of these culverts today is ample proof that Toncan Metal *does* resist rust. Installations, such as shown above, made years ago are still in use and show no signs of rust.

Toncan Metal Corrugated Culverts are ideal for every culvert service, as they combine strength with durability. Being light in weight, they are easy to handle and haul. Unskilled labor can install them without danger of breaking. They can be used in any kind of soil—the deep corrugations hold them securely in place. As for strength, they will hold up under heavy loads—whether buried under a deep or shallow fill. And above all, they are *permanent*.

We will be glad to send the name of the nearest Toncan Metal Corrugated Culvert manufacturer. Just drop a card to Dept. Q-49.

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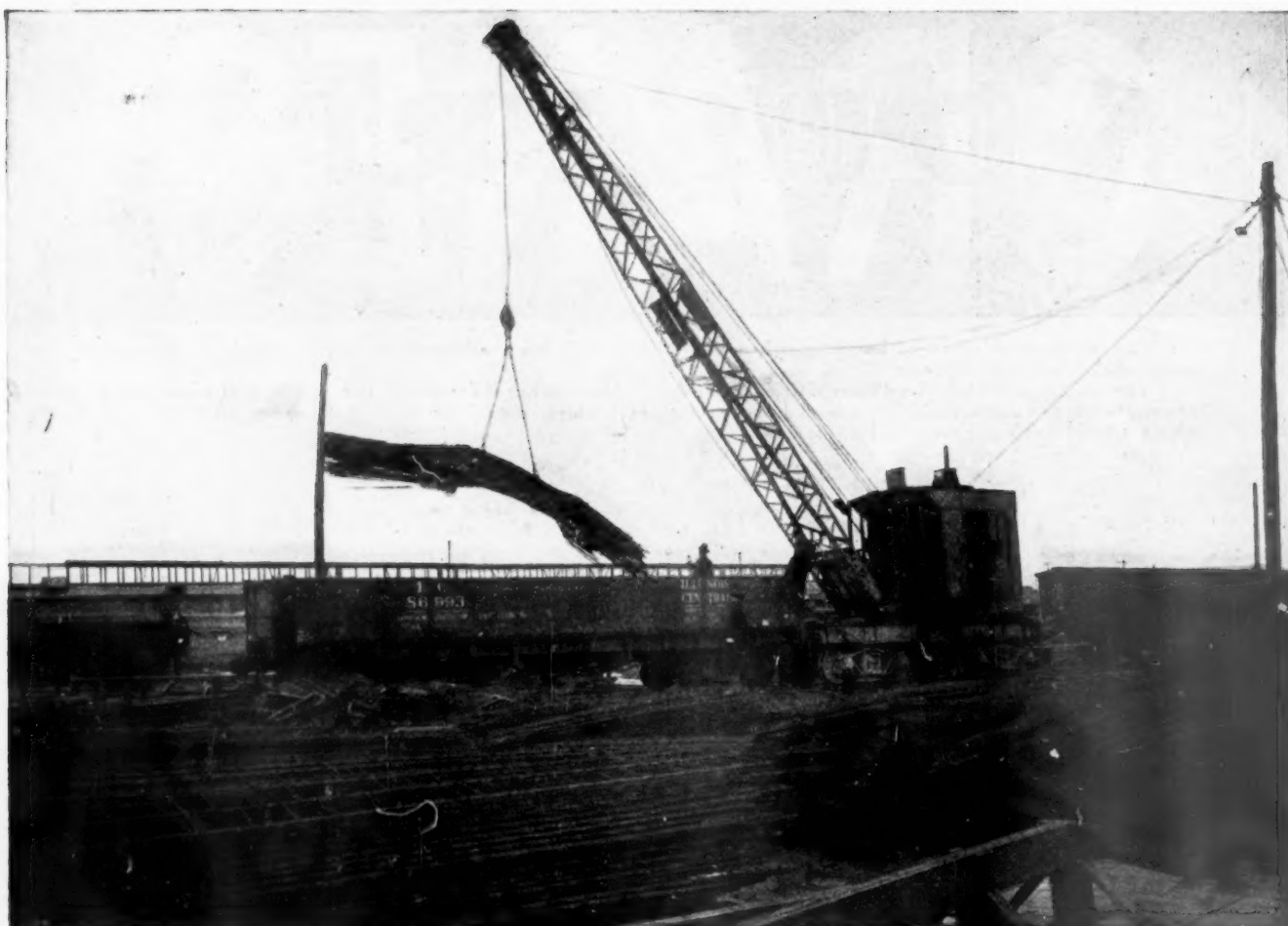
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Unloading cars of reinforcing bars is a hard job which was made easy by this Brownhoist Locomotive Crane. The bars are heavy and, as they bend under their own weight, are hard to handle any distance by hand.

By placing a sling around a number at a time, the Brownhoist handles big loads of bars on each trip and deposits them in piles as shown in the front of the picture. The bending and twisting of the bars does not interfere with the handling speed and the work is done much faster and more economically than it could be done by hand labor.

On the construction job where this crane was used, there were 5 Brownhoists at work. The cranes loaded trucks, unloaded and switched cars and handled all the sand, stone and heavy materials. Catalog K shows Brownhoists at work on many different kinds of jobs. Write for a copy if you are interested in handling materials.

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Locomotive Cranes  
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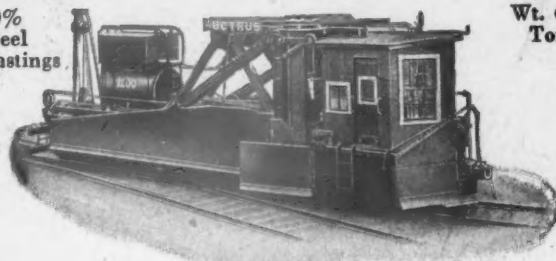
Modern Railroading demands speed, durability and dependability from all its equipment. O. & S. LOCOMOTIVE CRANES for railway service are ideal for coaling locomotives and handling materials. Write for Catalog No. 16—replete with valuable data for the railroad man.

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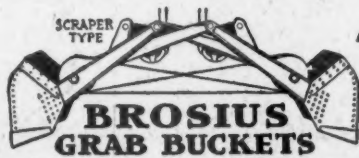
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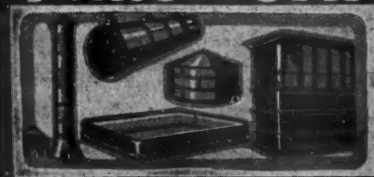
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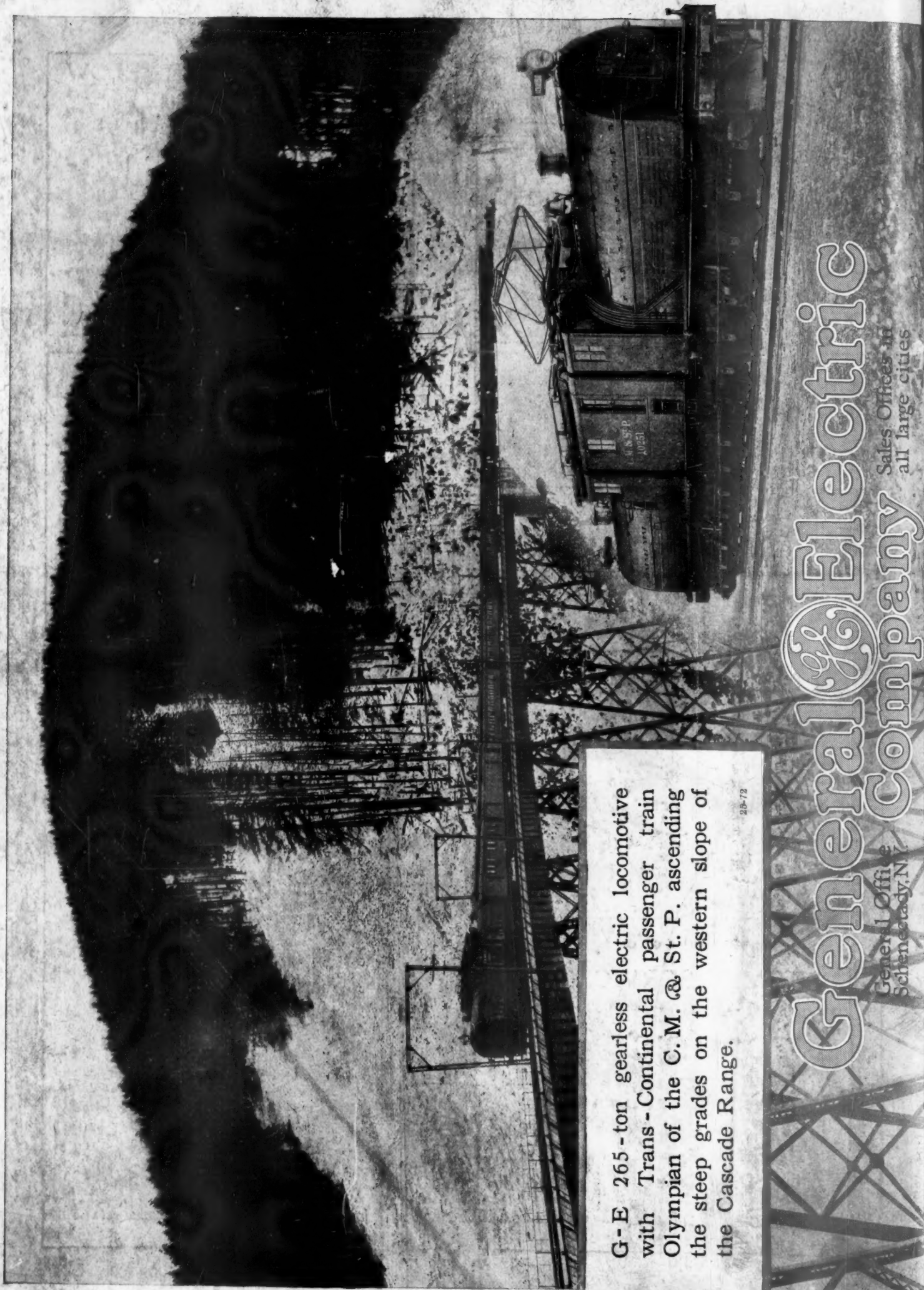
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